Arlington Conservation Commission

Date: Thursday, January 21, 2021
Time: 7:30 PM
Location: Conducted by Remote Participation

Please note: The listing of matters are those reasonably anticipated which may be discussed at the meeting. Not all items listed may in fact be discussed and other items not listed may be brought up for discussion to the extent permitted by law.

Agenda

1. Administrative

   a. In accordance with the Governor's Order Suspending Certain Provisions of the Open Meeting Law, G. L. c. 30A, § 20 relating to the COVID-19 emergency, the January 21, 2021 public meeting of the Arlington Conservation Commission shall be physically closed to the public to avoid group congregation. The meeting shall instead be held virtually using Zoom.

   Topic: Conservation Commission Meeting
   Time: January 21, 2021 07:30 PM Eastern Time (US and Canada)

   Register in advance for this meeting:
   https://town-arlington-ma-us.zoom.us/meeting/register/tJclcOmoqTkpE9C9MdVOPbR8UbuTuhDfIoCo

   Members of the public are strongly encouraged to send written comment regarding any of the hearings listed below to Conservation Agent Emily Sullivan at esullivan@town.arlington.ma.us.

   Please read Governor Baker's Executive Order Suspending Certain Provision of Open Meeting Law for more information regarding virtual public hearings and meetings: https://www.mass.gov/doc/open-meeting-law-order-march-12- 2020/download

   b. Review draft 01/07/2020 minutes.

   c. Updates: Community Preservation Act, Water Bodies Working Group

   d. Review 2020 goals and determine 2021 goals.

2. Discussion

   a. Regulations Update:
   Section 31: Climate Change Resilience
   Section 23: Floodplain

3. Hearings

   Request for Minor Plan Amendment

Request for Minor Plan Amendment:49 Spy Pond Lane (previously 47 Spy Pond Lane Lot 1/A)
MassDEP File #091-0318

7:45pm	This minor plan modification requests installing a porous paver patio and wall behind 49 Spy Pond Lane. The proposed patio is in line with the approved porch, and would not extend beyond the porch.

Notice of Intent

Deliberation: Notice of Intent: Arlington Reservoir Master Plan Phase 2, 210 Lowell Street Continued Hearing
MassDEP File #091-0327

7:55pm	This project consists of the second phase of implementation of the Arlington Reservoir Master Plan and includes the following activities: parking area and stormwater improvements; improvements to existing pathways to make them accessible under the Americans with Disabilities Act (ADA); renovation and addition of new recreational facilities; shoreline bank stabilization; and upland habitat restoration and invasive species removal. Proposed project work is within the 100-ft Wetlands Buffer and Inland Bank area of the Arlington Reservoir. This project was presented to the Commission at its 12/17/2020 and 01/07/2021 meetings.

Town of Arlington, Massachusetts

Review draft 01/07/2021 minutes

Summary:
Review draft 01/07/2020 minutes.

ATTACHMENTS:

	Type	File Name	Description
🗋	Minutes	01072021_Minutes_Conservation_Commission.pdf	Draft 01/07/2021 Minutes

Arlington Conservation Commission

Date: January 7, 2021
Time: 7:30pm
Location: Conducted through Remote Participation using Zoom

Minutes

Attendance: Commission Members Susan Chapnick (Chair), Mike Gildesgame, Pam Heidell, Dave Kaplan, Nathaniel Stevens, Chuck Tirone (Vice Chair), and David White; Associate Commissioner Doug Kilgour; and Conservation Agent Emily Sullivan. Associate Commissioner Cathy Garnett was not present. Representatives for the Arlington Reservoir NOI hearing included: Joe Connelly (Recreation Department), Leslie Mayer (Park & Recreation Commission), Danielle Desilets (KZLA), Brad Mustain (Woodard & Curran), Denise Cameron (Woodard & Curran), and Mikey Marcus (SWCA). Representatives for the 59 Lowell Street NOI included: Kathleen Moriarty. Members of the public included: Ann LeRoyer, Johanna Meyer, Daniel Baczkowsi, George Stephans, Michael Ratner, and Allan Tosti.

12/03/2020 Meeting Minutes

The Commission discussed edits to the draft 12/03/2020 minutes. D. White motioned to approve the minutes as edited, N. Stevens seconded, all were in favor, motion approved. A roll call vote was taken. S Chapnick voted yes, M. Gildesgame voted yes, P. Heidell voted yes, D. Kaplan voted yes, C. Tirone voted yes, N. Stevens voted yes, and D. White voted yes.

12/17/2020 Meeting Minutes

The Commission discussed edits to the draft 12/17/2020 minutes. N. Stevens motioned to approve the minutes as edited, D. Kaplan seconded, all were in favor, motion approved. A roll call vote was taken. S Chapnick voted yes, M. Gildesgame voted yes, P. Heidell voted yes, D. Kaplan voted yes, C. Tirone voted yes, N. Stevens voted yes, and D. White voted yes.

Draft 2020 Annual Report

The Commission discussed edits to the draft 2020 A~~a~~nnual R~~r~~eport. N. Stevens motioned to approve the ~~minutes~~ Annual Report as edited, D. White seconded, all were in favor, motion approved. A roll call vote was taken. S Chapnick voted yes, M. Gildesgame voted yes, P. Heidell voted yes, D. Kaplan voted yes, C. Tirone voted yes, N. Stevens voted yes, and D. White voted yes.

Notice of Intent: 210 Lowell Street, Arlington Reservoir Master Plan Phase 2
MassDEP File #091-0327
Documents Reviewed:

1) *Arlington Reservoir Renovation Project Phase 2 NOI, prepared by SWCA, dated December 3, 2020*
2) *Arlington Reservoir Phase 2 NOI Plan Set, prepared Kyle Zick Landscape Architecture Inc, stamped by Kyle Zick RLA# 1163, dated November 13, 2020*
3) *Arlington Reservoir Phase 2 Stormwater Management Report, prepared by Woodard & Curran, stamped by Denise L Cameron PE# 56348, dated October 2020*
4) *Arlington Reservoir Supplemental Memo from KZLA, prepared by Kyle Zick Landscape Architecture Inc, dated December 30, 2020.*
5) *Arlington Reservoir Supplemental Memo from SWCA, prepared by SWCA Environmental Consultants, dated December 31, 2020.*
6) *Arlington Reservoir Phase 2 Revised Stormwater Management Report, prepared by Woodard & Curran, stamped by Denise L Cameron PE# 56348, dated October 2020, updated December 2020.*
7) *Arlington Reservoir Revised Parking Lot Plans, prepared by Woodard & Curran, stamped by Denise L Cameron PE# 56348, dated November 2020, revised December 30, 2020.*
8) *Arlington Reservoir Revised Tree Landscaping Plans, prepared by Kyle Zick Landscape Architecture Inc, stamped by Kyle Zick RLA# 1163, dated December 19, 2020, revised December 30, 2020.*

Resource Areas:

1) *100-ft Wetlands Buffer*
2) *Adjacent Upland Resource Area*
3) *Inland Bank*
4) *Arlington Reservoir*

This project consists of the second phase of implementation of the Arlington Reservoir Master Plan and includes the following activities: parking area and stormwater improvements; improvements to existing pathways to make them accessible under the Americans with Disabilities Act (ADA); renovation and addition of new recreational facilities; shoreline bank stabilization; and upland habitat restoration and invasive species removal.

Mickey Marcus and Danielle Desilets presented the project proposal and reviewed the supplement information requested at the Commission's December 17, 2020 meeting.

The Commission requested the following supplemental information and materials during the December 17, 2020 meeting:
1) Information on Lexington's stabilized granite requirements
2) Recalculate stormwater calculations using NOAA Atlas 14+ (NOAA+)
3) Review removal/replacement of trees
4) Add erosion controls (silt sack) around turf area in parking lot to prevent siltation
5) Propose alternatives to glyphosate invasive treatment

6) Coordinate with DPW to ensure parking lot is not used as a snow dump
7) Revise parking lot O&M Plan to include regenerative air sweeper
8) Revise invasive management to include as much cut-and-dab, not spray, of herbicides as possible
9) Update plan set with changes (erosion controls, plan has erosion control matting near flared end but rip rap might be better)

B. Mustain stated that the recalculation of the stormwater calculations using the NOAA+ did not change the stormwater results much at all and did not change the design of the proposed stormwater system.

M. Marcus reviewed alternative to glyphosate, and stated that there are two lists of approved herbicides in Massachusetts, the first of which is approved by the EPA and the second of which is approved by the EPA and MassDEP (a subset of the EPA list). The alternatives proposed are from the EPA and MassDEP list.

J. Connelly confirmed that the Department of Public Works will not be using the Res parking lot for snow storage.

D. Kaplan asked for successful examples of coir fascine installation along banks for erosion control and stabilization. M. Marcus stated that this method was used at Spy Pond. D. Kaplan asked if the backfill between the logs and the bank need to be considered floodplain fill and therefore require compensatory flood storage. M. Marcus stated that he has never seen a similar project consider backfill floodplain fill, and that MassDEP and the Army Corps of Engineers do not consider backfill in this situation to be floodplain fill.

D. White asked how the change in water elevation at the Res would impact the coir logs. M. Marcus stated that if the water overtops the coir logs there could be erosion into the Res and that there could be plant survival issues.

N. Stevens suggested that ~~stated~~ that the Commission ~~could~~ might condition water elevations at certain times of the year. J. Connelly stated that DPW controls the water level for a variety of reasons – water level in the swim area, flood storage for impending rain events, etc. P. Heidell stated she would be uncomfortable conditioning water levels and would rather ask DPW to be cognizant of how water level impacts the coir logs and/or stress the objectives of the coir logs (for bank restoration), rather than the means.

S. Chapnick stated that the Commission could condition the success of the coir logs. P. Heidell stated that the Commission could condition the success of the coir logs or an alternative, because ultimately the Commission is interested in the project's objective rather than method.

P. Heidell asked for more information on the construction specifications for the coir logs.

D. Kaplan stated that coir logs have been used in upland projects in Cambridge, but not in bank projects.

S. Chapnick asked how freeze/thaw impacts coir logs. M. Marcus stated that the Spy Pond coir logs were installed using wooden stakes which can be impacted by freeze/thaw. This project is proposing to install the coir logs using earthen anchors, which are more secure than wooden stakes.

C. Tirone asked for clarification on the installation of the coir logs – will they be installed on the top of bank, in undercut areas, or someplace else along the bank? M. Marcus stated the logs would be installed in undercut areas and effectively become the new bank. M. Marcus stated that shoreline stabilization proposed in this project varied from installing additional plantings in less eroded areas to installing the coir logs and adding backfill and plantings in the more eroded areas.

D. White asked how the project considered the equipment needed for water chestnut harvesting. D. Desilets stated that the harvester will be deployed into the water using the boat ramp. The boat ramp was designed based on the specifications of the harvester. D. White stated that the water chestnuts are dewatered on the spillway and so there will still need to be access from the boat ramp to the spillway. D. Desilets said ?? in response??

P. Heidell asked if the Lexington Conservation Commission has given any feedback on the project that would change Arlington components of the project. D. Desilets stated that the project had its first Lexington hearing on January 4, 2021 and that they did not provided feedback that would change any of the components located in Arlington. The Lexington Commission requested that the perimeter trail be shifted in a few areas, but only for trail located in Lexington.

S. Chapnick stated that she had wished C. Garnett would be at this hearing to provide comments on the revised tree planting plan. D. Desilets stated that the revised tree planting plan did not make any changes to the proposed replacement trees. Most of the new trees are for beach shading or playground shading. Replacement trees are also being added to fill tree gaps along the shoreline in the parking lot area.

S. Chapnick stated that she would follow up with C. Garnett on the revised tree planting plan.

D. Kaplan asked whether the Commission could impose a condition ~~a statement about trees,~~that ~~stating~~ the final tree planting plan needs approval from the Commission, rather than continue the hearing. N. Stevens didn't fully agree but thought that any minor planting changes could be considered field changes or handled through a plan change. ~~[NS: not sure if Pam agreed with that or said something else]~~ ~~and P. Heidell agreed with this statement, and stated that the condition could be worded so that the Commission could assist with any field changes to the plan. M. Gildesgame~~P. Heidell

recommended that approval or consultation from the Commission should occur before trees are ordered so extra trees are not ordered.

S. Chapnick stated that the Arlington Commission should also coordinate conditions with the Lexington Commission. The next Lexington hearing is January 19, 2021 and the Lexington Commission anticipates closing.

N. Stevens stated that since the Commission needs to issue an Order of Conditions within 21 days of closing the public hearing, it may be best to continue the Arlington hearing once more. C. Tirone agreed, and stated that closing the hearing next meeting (January 21, 2021) would also the Arlington and Lexington Conservation staff to coordinate conditions.

At the consent of the applicant, C. Tirone motioned to continue the public hearing for the Reservoir Phase 2 NOI to the Commission's January 21, 2021 meeting, N. Stevens seconded, all were in favor, motion approved. A roll call vote was taken. S Chapnick voted yes, P. Heidell voted yes, D. Kaplan voted yes, M. Gildesgame voted yes, N. Stevens voted yes, C. Tirone voted yes, and D. White voted yes.

Request for Determination of Applicability: 59 Lowell Street
Arlington File #A21.1
Documents Reviewed:
1) *59 Lowell Street RDA packet, submitted by Kathleen Moriarty, dated December 4, 2020.*

Resource Areas:
1) *100-ft Wetlands Buffer*
2) *Adjacent Upland Resource Area*
3) *No Name Brook*

The project proposes to construct an above-ground exercise swim spa partially within the Wetlands 100-ft Buffer and Adjacent Upload Resource Area (AURA) of No Name Brook. The swim spa will be set in a lawn area next to the back of the house and stairs down to the back yard.

K. Moriarty stated that the minor increase in impervious surface due to the swim spa will be offset by additional native plantings. K. Moriarty stated that the proposed location of the swim spa was as least intrusive into the resource area as it could be due to setback requirements.

S. Chapnick asked when the shed on the property was constructed. K. Moriarty stated that she did not know, that it was constructed prior to her purchase of the property.

N. Stevens asked if the bikeway was at grade with the backyard. K. Moriarty stated that the bikeway was at a higher elevation than her backyard and that no drainage from the backyard flows towards No Name Brook which is located on the other side of the bikeway.

N. Stevens asked if the swim spa requires regular water changes and drainage. K. Moriarty stated that it is functional year-round so does not require seasonal drainage. K. Moriarty stated she would drain the unit on the lawn, away from the resource area.

D. Kaplan observed that there is a lot of lawn in the resource area, and asked whether environmentally friendly lawn care was practiced. K. Moriarty stated that she uses all natural lawn care.

M. Gildesgame asked whether excavation is required for the swim spa. C. Tirone asked if a small retaining wall was required for the swim spa. K. Moriarty stated that a small retaining wall would be installed to level the installation area.

C. Tirone recommended that K. Moriarty look into the Operation & Maintenance requirements of the swim spa and be weary of where draining occurs. C. Tirone stated that the swim spa should not be treated with chemicals in the days prior to draining the unit.

P. Heidell stated that this project is low impact and ~~right on the~~is at the outer edge of the resource area. N. Stevens agreed with P. Heidell, stating the retaining wall was low impact. D. White stated he agreed with P. Heidell and N. Stevens. S. Chapnick stated that she also agreed.

The hearing was opened for public comment.

J. Meyer stated that there was a swale at the end of the property that eventually drains to No Name Brook. J. Meyers stated that the proposed plantings were good.

S. Chapnick recommended installing plants that absorb chlorine and installing the plantings along the property's fence line closest to No Name Brook. N. Stevens informed K. Moriarty of the Commission's recommended planting list, accessible on the Commission's webpage.

N. Stevens motioned to issue a negative determination for 59 Lowell Street, that although the work is within jurisdiction, it does not require a Notice of Intent (Negative Determination #3), D. White seconded, all were in favor, motion approved. A roll call vote was taken. S Chapnick voted yes, M. Gildesgame voted yes, Pam Heidell voted yes, Dave Kaplan voted yes, Nathaniel Stevens voted yes, Chuck Tirone voted yes, and David White voted yes.

Discussion: Warrant Article: Zoning Bylaw Amendment/Allow cemetery use in the open space district

A. Tosti, Town Meeting Member from Precinct 17, presented a proposal for a warrant article for 2021 Annual Town Meeting. The warrant article proposes to amend the zoning bylaw to allow cemetery use for only cremated remains in the ~~o~~Open ~~s~~Space zoning district, including conservation lands. A. Tosti gave the example of a program at

the First Parish Church in Arlington, through which cremated remains can be placed in the courtyard of the Church. The cremated remains cannot be in a container and are placed in holes dug 1 foot deep. The Church uses the revenue generated by this program to maintain and enhance the courtyard.

A. Tosti provided four reasons why this warrant article would be beneficial for the Town:

1. There is limited burial space at the Mt Pleasant Cemetery
2. Traditional burial and funeral practices are incredibly expensive and this is a much more affordable option
3. This could be a potential revenue source for the Commission and help with maintenance costs of conservation lands
4. Arlington residents are spiritually connected to Arlington open spaces

A. Tosti clarified that the intent of this warrant article is not to turn open spaces into cemeteries. Final approval for the warrant article would need to come from Town Meeting.

S. Chapnick stated that according to Massachusetts state law, people are allowed to spread cremated remains anywhere on public open space unless there is a local ordinance or bylaw that explicitly prohibits it.

S. Chapnick wondered if allowed cremated remains in open spaces would impact resource areas by the need to create pathways or structures. S. Chapnick also stated that she did not support cremation because of the carbon emissions generated through cremations.

N. Stevens stated that he was sympathetic to Mr. Tosti's stated goals of ~~t~~his proposal and alternative burial options. N. Stevens also stated that he was concerned with possible conflicts of use ~~in~~ of open spaces that this warrant article could create. He stated that it could be difficult for the Commission to accommodate a program like this and ensure that is a secondary or tertiary purpose to open space and passive recreation.

N. Stevens asked if A. Tosti reached out to the Open Space Committee about this proposal. D. White stated that this concept needs more public discussion.

A. Tosti stated that ultimately the Arlington Redevelopment Board would need to be consulted on specific language since it would require a zoning bylaw change.

D. White stated that the cemetery was expanded to include a columbarium, which might address some of the need for alternative burial options.

A. LeRoyer, Chair of the Open Space Committee, stated that the Open Space Committee had not discussed this concept. A. LeRoyer asked if this was an acceptable use of Article 97 protected lands. A. LeRoyer said this concept would be discussed

during the Committee's update of the Open Space and Recreation Plan, kicking off this month.

C. Tirone stated he was open to discussing this concept more, and would like to see more discussion with other town committees.

The Commission agreed that this should be discussed with the Open Space Committee, the Cemetery Commission, the Redevelopment Board, and the Park and Recreation Commission.

A. Tosti stated that he already submitted the warrant article, but that he would pull it back so that there could be more public discussion on the concept over the next year.

A. LeRoyer recommended that A. Tosti research Mt. Auburn Cemetery's alternative burial practices.

ZBA Update – 40B Projects
D. White recused himself from the discussion regarding the Thorndike Place proposal.

S. Chapnick updated the Commission on the status of the Thorndike Place Comprehensive 40B Permit. The Commission submitted a comment letter for the ZBA's December 22, 2020 Thorndike Place hearing. C. Tirone stated that during this meeting, he made a comment regarding a trail connection to the bikeway. C. Tirone stated that a trail was likely feasible given the local and state wetlands regulations, but that the Applicant had not proposed the connect trail so the Commission could not provide feedback on the concept.

S. Chapnick updated the Commission on the status of the 1165R Mass Ave Comprehensive Permit. The 1165R Mass Ave proposal was presented to the ZBA at its first hearing on January 5, 2021. During this hearing, Town Counsel and Special Town Counsel reviewed the process for a 40B Comprehensive Permit Application, and went through what information the ZBA can expect to review as part of the permitting. The ZBA has not yet published a schedule with the hearing topics yet, so the Commission does not know when wetlands and stormwater information will be reviewed. N. Stevens stated that there does not seem to be a need for a third party reviewer to review wetlands information, but should review stormwater information. C. Tirone stated that the project must include onsite environmental improvements. The Commission discussed drafting a comment letter when the hearing schedule is released.

D. White motioned to close the Commission meeting, N. Stevens seconded, all were in favor, motioned approved.

Meeting adjourned at 10:00pm.

Town of Arlington, Massachusetts

General Updates

Summary:
Updates: Community Preservation Act, Water Bodies Working Group

Town of Arlington, Massachusetts

Commission Goals

Summary:
Review 2020 goals and determine 2021 goals.

ATTACHMENTS:

	Type	File Name	Description
	Reference Material	Goals_and_Actions_2020_revised_for_2021.pdf	2020 and 2021 Goals

TOWN OF ARLINGTON
730 Massachusetts Ave.
Arlington, MA 02476
781-316-3012

ARLINGTON CONSERVATION COMMISSION

Goals and Actions Identified for 2020

Yellow-highlighted goals/actions were prioritized for 2020 based on Conservation Commission meetings in Jan/Feb 2020.
Blue text indicates whether or not it was achieved and clarifications.

2021 Goals Outlined in the 2020 Annual Report

A. Continue to strengthen and update regulations for permitting efficiency and process clarity with the specific goal to update the local Wetlands Regulations in early 2021.
B. Improve the stewardship of conservation lands through better coordinated land management.
C. Improve communication and educational outreach to residents in resource areas.
D. Continue to look for opportunities to work collaboratively with neighboring towns and allied organizations towards protection of wetland resources.

1. Strengthen and update regulations for performance standards, permitting efficiency, and process clarity

- Revise the Arlington Regulations for Wetlands Protection
  Began in 2020 – expected completion and vote early 2021
  Commission needs to coordinate public review of the revision and disseminate it to other boards/committees/departments for review prior to vote
- Add administrative project/general project process to regulations
  Done – added to revised regulations expected to be completed early 2021
- Add a consent agenda to meetings
- Have Commission review/approve special conditions and OOCs for permits prior to permit issuance
  Done – this has been enacted as standard practice for OOCs

2. Host additional collaborative community clean-up and educational events

- Devote 1-2 hours of a meeting to a wetland topic training and invite an expert to give the training
  Not Accomplished
- Target trainings to frequent issues in Town
- Coordinate with schools for project ideas and class curriculums
- Open space clean-ups
  Not Accomplished due to COVID-19
  Commission likely won’t be able to host clean-ups until the summer or later per Town policies

3. Improve the stewardship of conservation lands and other town open spaces

- Identify maintenance needs/gaps for ACC-managed properties and secure town resources for implementation

In progress - Planning and Community Development Department submitted CPA Grant application for a Public Land Management Pan

- Open space clean-ups
- Tree planting
- Cooke’s Hollow
- Vegetative buffers (C. Garnett's project)

  In progress
- Floating wetlands pilot project
- Coordinate regional management of Upper/Lower Mystic Lakes

  In progress – Have reached out to both the Winchester and Medford Conservation Agents, received all of Winchester’s permits and waiting for Medford’s. General interest from Winchester and Medford in coordinating Mystic Lake treatments but need to come to an agreed process for coordination with other municipalities.
- Promote low-impact landscaping, connect with groups like Garden Club and Sustainable Arlington
- Promote natural resource benefits
- Invasive removal
- Certify vernal pools
- Coordinate regional management of Upper/Lower Mystic Lakes

4. Improve communication and educational outreach to residents in resource areas

- Create a floodplain guidance document / resource area document

  In progress – Draft document created but Commission asked Agent to find guidance from floodplain trainings. All 2020 trainings cancelled due to COVID-19 but will look into 2021 trainings.
- Write educational articles for the Advocate and online
- Add tips and FAQ to webpage
- Include open forum for general questions on meeting agendas
- Create a list of all properties that fall under Commission jurisdiction and proactively send mailings about permitting procedures
- Attend MACC and AMWS workshops

5. Other

- Allow agenda time during a meeting at least once per quarter to discuss how processes are going, recommendations for improvements/changes, needs for education, and to evaluate how the Commission is progressing on 2020 goals
- Include open forum for general questions on meeting agendas
- Create a master permit tracking list

  Done – need to add a 2021 goal to update and review this list on a regular basis.
  This list is updated with every permit application we receive.
- Schedule site visits for substantive projects prior to first hearing
- Encourage the Conservation Agent to provide recommendations on applications during hearing
- Have Commissioners submit questions/comments prior to first hearing
- Invite other town committees (Park & Recreation, DPW, etc.) to meetings to discuss areas of overlap and to improve permit coordination
- Create a permitting guide with ZBA, Inspectional Services, ARB, etc.

- Encourage each Commission member to lead at least one special project during the year or act as liaison to an existing project/effort.

Town of Arlington, Massachusetts

Regulation Update

Summary:
Regulations Update:
Section 31: Climate Change Resilience
Section 23: Floodplain

ATTACHMENTS:

	Type	File Name	Description
🗋	Reference Material	Section_23_Floodplain_2021Updated.pdf	Section 23: Floodplain
🗋	Reference Material	Section_31_Climate_Change_Resilience_2021Updated.pdf	Section 31: Climate Change Resilience

Section 23 - Land Subject to Flooding (Bordering and Isolated)

A. Findings.

(1) Bordering land subject to flooding.

(a) Bordering land subject to flooding is an area which floods from a rise in a bordering waterway or water body. Such areas are presumed to be significant to flood control and storm damage prevention and protection of surrounding land and other homes or buildings. In these ways, bordering land subject to flooding is important in mitigating the negative impacts of climate change.

(b) Bordering land subject to flooding provides a temporary storage area for floodwater which has overtopped the bank of the main channel of a creek, brook, river or stream or the basin of a pond or lake. During periods of peak runoff, floodwaters are both retained (i.e., slowly released through evaporation and percolation) and detained (slowly released through surface discharge) by bordering land subject to flooding. Over time, incremental filling of these areas causes increases in the extent and level of flooding by eliminating flood storage volume or by restricting flows, thereby causing increases in damage to public and private properties and downstream resource areas.

(c) The hydrologic regime, plant community and structure, topography, soil, and proximity to water bodies or vegetated wetlands provide important food, shelter, migratory, and overwintering areas, and breeding for wildlife.

(d) The hydrologic regime, surrounding plant community, topography, soil, and proximity to water bodies or vegetated wetlands make bordering land subject to flooding allow vegetation to successfully grow in these areas.

(e) The Commission has found that use of such areas or garages results in a significant or cumulative effect upon the resource area values protected by the Bylaw, and has found that these facilities can result in the uncontrolled acute or chronic release of these harmful materials into the resource areas protected by the Bylaw. The Commission has also found that using these structures for flood storage can result in the damage of vehicles and property under flooding conditions.

Comment [NS1]: This could/should be moved to A. Findings.

(2) Isolated land subject to flooding.

(a) Isolated land subject to flooding is an isolated depression or a closed basin which serves as a ponding area for runoff or high groundwater which has risen above the ground surface. Such areas are likely to be locally significant to flood control and storm damage prevention. In this way, isolated land subject to flooding is important in mitigating the impacts of climate change. In addition, where such areas are underlain by pervious material they are likely to be significant to public or private water supply and to groundwater supply. Where such areas are underlain by pervious material covered by a mat or organic peat and muck, they are also likely to be significant to the prevention of pollution. Isolated land subject to flooding provides important breeding habitat for amphibians and some rare plants. Isolated land subject to flooding provides a temporary storage area where runoff and high groundwater pond and slowly evaporate or percolate into the substrate. Filling causes lateral

Comment [NS2]: Is this applicable to Arlington? Only one private well in town, if it still exists, and we're on MWRA.

displacement of the ponded water onto contiguous properties, which may result in damage to said properties.

(b) Isolated land subject to flooding, where it is underlain by pervious material, provides a point of exchange between groundwater and surface waters. Contaminants introduced into said area, such as road salts, find easy access into the groundwater. Where these conditions occur and a mat of organic peat or muck covers the substrate of the area, said mat serves to detain and remove contaminants which might otherwise enter the groundwater.

B. Definitions, critical characteristics and boundaries.

(1) Bordering land subject to flooding.

(a) Bordering land subject to flooding is an area with low, generally flat topography adjacent to and inundated by floodwaters rising from brooks, creeks, rivers, streams, pond or lakes. It extends from the banks of these waterways and water bodies; where a bordering vegetated wetland occurs, it extends from said wetland.

(b) The topography and location of bordering land subject to flooding specified in the foregoing Subsection B(1)(a) are critical to the protection of the interests specified in subsection A(1) above.

(c) The boundary of bordering land subject to flooding is the estimated or observed maximum lateral extent of floodwater which will theoretically result or has resulted from the statistical 1%-annual-chance flood (also known as the one-hundred-year-frequency storm).

1. Said boundary shall be that determined by reference to the most recently available flood profile data prepared for the Town of Arlington within which the work is proposed under the National Flood Insurance Program (NFIP, currently administered by the Federal Emergency Management ~~a~~Agency)~~, successor to the U.S. Department of Housing and Urban Development)~~. Said boundary, so determined, shall be presumed accurate. This presumption may be overcome only by credible evidence from a registered professional engineer or other professional competent in such matters.

2. Notwithstanding the foregoing, where NFIP profile data is unavailable or is determined by the Commission to be outdated, inaccurate or not reflecting current conditions, the boundary of bordering land subject to flooding shall be the maximum lateral extent of floodwater which has been observed or recorded or the Commission may require the applicant to determine the boundary of Bordering Land Subject to Flooding by engineering calculations which shall be:~~.~~

   i. based upon NOAA Atlas 14, Volume 10 (latest version) "NOAA Plus"; "NOAA Plus" ~~which~~ is the NOAA Precipitation Frequency estimates at the upper bound of the 90% confidence level. It is calculated by multiplying the NOAA Upper Confidence for the 100-year 24-hour design storm by 0.9. (Example: if NOAA 100-year 24 hour design storm is 8.16 inches and the upper bound of the 90% confidence interval is 11.5 inches, NOAA Plus would be 11.5 x 0.9 = 10.35 inches for the 100-year 24-hour design storm).

Comment [NS3]: That reference is out of date.

Comment [4]: DK. Question for the Commission. Are we determining current BFE and resulting BLSF boundaries outdated? Should we/the Town develop a new overlay developed from Atlas 14 Plus, or other synthetic storm event?

Comment [NS5]: Your comment makes me wonder what rainfall data FEMA (or their contractors) use in developing the BFE.

Comment [NS6]: Style point: We should either capitalize for letter of each word in this term or leave in lower case but not have it both ways. I favor capitalizing. I noticed that most of the other RA sections are not capitalized. Hmm, I wonder who wrote that. =)

Comment [7]: PH. DEP is recommending using NOAA Plus for its revised stormwater standards. Per DEP: NOAA Plus is said to account for larger observed storms, to incorporate risk observed in current data to reflect range of larger observed storms, to provide greater resiliency for infrastructure, requires design to address upper range and larger stormwater controls, and would expand BLSF boundaries that are regulated, reducing flood risk. NOAA Plus is an off-the shelf method that can be implemented.

ii. based upon the standard methodologies set forth in U.S. Soil Conservation Service Technical Release No. 55, Urban Hydrology for Small Watersheds and Section 4 of the U.S. Soil Conservation Service, National Engineering Hydrology Handbook; and

iii. prepared by a registered professional engineer or other professional competent in such matters.

(2) Isolated land subject to flooding.

(a) Isolated land subject to flooding is an isolated depression or closed basin without an inlet or an outlet. It is an area which at least once a year confines standing water. Isolated land subject to flooding may be underlain by pervious material, which in turn may be covered by a mat of peat or muck.

(b) The characteristics specified in the foregoing Subsection B(2)(a) are critical to the protection of the interests specified in Subsection A(2) above.

(c) The boundary of isolated land subject to flooding is the perimeter of the largest observed or recorded volume of water confined in said area.

C. No activity, other than the maintenance of an already existing structure which will result in the building within or upon, or removing, filling, dredging or altering of, land subject to flooding shall be conducted without written permission of the Conservation Commission.

Any proposed activity within bordering land subject to flooding shall also be governed by all regulations of the Floodplain District of the Arlington Zoning Bylaw, the Town of Arlington Stormwater Bylaw and regulations, the State Wetlands Protection Act (G.L. c. 131, sec. 40), the state Wetlands Regulations (310 CMR 10.00), and the State Building Code~~,~~ (780 CMR).

D. The Commission may permit activity on land subject to flooding provided it shall not result in the following:

(1) Flood damage due to filling which causes lateral displacement of water that would otherwise be confined within said area;

(2) Adverse effect on surface or groundwater, where said area is underlain by pervious material;

(3) An adverse effect on the capacity of said area to prevent pollution of the groundwater, where the area is underlain by pervious material which in turn is covered by a mat of organic peat and muck.

(4) A rise in the base flood elevation anywhere in the floodplain. This must be demonstrated through hydrologic and hydraulic analysis performed in accordance with standard engineering practice performed by a registered professional.

(5) Reduction in the ability of the land to buffer more inland areas from flooding.

(6) Compensatory flood storage shall be at a 2:1 ratio, minimum, for each unit volume of flood storage lost at each elevation.

The applicant shall take into consideration the impacts of climate change on the activities proposed on land subject to flooding, especially in terms of the compensatory flood storage as a

Comment [NS8]: Has anyone checked these instructions to be sure that neither recommend use of TP-40 data? Don't want to create a contradiction with the prior paragraph.

Comment [ES9]: TR-55 states that TP-40 has been superseded by NOAA Atlas 2; Chapter 4 (Storm Rainfall Depth) of the National Engineering Hydrology Handbook lists TP-40 as a published rainfall data analysis that should be used for states east of the Rockies, expect for storm durations of 60 minutes or less

Comment [10]: PH: Question for Commission: Do we want to revise this to have a minimum size which is not as big as DEP's definition, but somewhere in between a puddle and DEP's requirement to at least once a year have at least 1/4 acre foot of standing water. to an average depth of at least 6 inches.

Comment [NS11]: I have a comment in my notes, too, about whether the Commission wishes to set a minimum size. We could also exclude them if they're in a paved area.

Comment [12]: 15,000 gal ~ 0.1 AF @ 6" depth?

Comment [13]: PH note: he Massachusetts 2020 Model Floodplain Bylaw includes language that says permits are required for all proposed construction and development in the floodplain overlay district. The NFIP requirements focus on all development in the floodplain, and defines development to include "any man-made change to improved or unimproved real estate, including but not limited to building or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations." So, suggest we should have different standards for BSLF versus ISLF, e.g, minor activities in ISLF don't need permit or can be addressed in administrative review.

Comment [14]: At one point, we discussed setting minor activity or minimum flood storage displacement volume thresholds for BLSF e.g. deck footings. Perhaps consider 1:1 mitigation for these types of activities if we decide to consider any relief therefrom.

Comment [NS15]: I think this significant standard should be more visible and not buried in a long paragraph. Fine to repeat it.

climate change resilience strategy. Any such activity shall provide compensatory flood storage for all flood storage volume that will be lost at each elevation. Compensatory flood storage shall be at a 2:1 ratio, minimum, for each unit volume of flood storage lost at each elevation. Compensatory flood storage shall mean a volume not previously used for flood storage, shall have an unrestricted hydraulic connection to the same waterway or water body, and, with respect to waterways, shall be provided within the same reach of the river, stream, or creek. Work within Bordering Land Subject to Flooding, including that work required to provide the above specified compensatory storage, shall not restrict flows so as to cause an increase in flood stage or velocity. No new parking areas or garages shall be used as compensatory flood storage.

E. No work shall be performed within 50 feet of land subject to flooding that abuts an estimated habitat area as designated on the most current map prepared by the Massachusetts Natural Heritage and Endangered Species Program unless the Applicant can demonstrate by a preponderance of credible evidence that the work will not have any short term or long term adverse effect on the resource area values protected by the Bylaw.

Comment [NS16]: Could we move this? Seems to detract and be in the way of the requirements for compensatory storage.

Comment [NS17]: We could include this definition in Section 4 "Definitions"

Comment [ES18]: Definition added to Section 4

Comment [19]:
Question: Should we consider mitigating displacement of flood storage in pore space of soils above water table elevation? This came up in the Thorndike hearing public comments when discussing underground parking in the flood zone.

Section 31 – Climate Change Resilience

A. The impacts of climate change can adversely affect each Resource Area's ability to provide and promote the resource area values protected by the Bylaw. (See definitions of "adaptation" and "alter" and "impacts of climate change" "resource area values" and other climate change-related definitions in Section 4 above). Resource Areas are critical to building a community's resilience/adaptation to the impacts of climate change due to their ability to provide for flood control, storm damage prevention, ~~and other Resource Area Values.~~ extreme temperature mitigation, and other Resource Area Values including but not limited to water supply protection; pollution prevention; erosion and sedimentation control; protection of surrounding land and other homes or buildings; wildlife, plant, and aquatic species protection; habitat protection; and the protection of the natural character or recreational values of the wetland resources.

B. The Applicant shall, to the extent practicable and applicable as determined solely by the Commission, integrate considerations of adaptation planning into their project to promote climate change resilience so as to protect and promote resource area values into the future. These considerations are especially important in Land Subject to Flooding (floodplain) and Riverfront Area and other Resource Areas which protect the interest of Flood Control and Storm Damage Prevention, including Adjacent Upland Resource Areas. These Resource Areas may be directly impacted by extreme weather events expected to be more prevalent or more intense due to climate change, in surface runoff of pollutants, and in wildlife habitat due to changes in temperature.

C. The Applicant shall, to the extent practicable and applicable as determined solely by the Commission, ensure that the project is consistent with other local and state regulations, guidelines, and policies concerning climate change resilience, including, but not limited to: municipal vulnerability preparedness (MVP) and hazard mitigation, clean energy, energy efficiency, green infrastructure, and nature-based solutions.

The Applicant shall consider the project's adaptation to potential climate change impacts by addressing the following in writing:

(1) Describe project design considerations to limit storm and flood damage during extended periods of disruption and flooding as might be expected in extreme weather events. For complex/larger projects, the Commission may require mapping of potential for flooding in the affected resource area, modeled out to future horizons (e.g., 2030, 2050, 2070). See Vegetative Wetlands Section 21, Land Subject to Flooding Section 23, and Adjacent Upland Resource Area Section 25, of these Regulations.

(2) Describe project stormwater surface runoff~~, which~~ that is expected to ~~may~~ increase due to ~~storm surges and~~ extreme weather events and sea level rise, and how this will be managed / mitigated to prevent pollution (including nutrients from fertilizers, roadway runoff, etc.) from entering the resource area in the future, with consideration of

Comment [NS1]: I hesitate the Commission shall ensure that a project is even "consistent" with other state regulations that we do not tasked to administer. While not saying "comply with", it does beg the question. I think just saying "guidelines and policies" or "guidelines, policies, and practices" is sufficient.

Comment [NS2]: This is vague. I think we need to pick one or two future time periods.

Comment [NS3]: Is this too much of a coastal term?

eliminating or decreasing impervious surfaces as much as feasible. See Stormwater Management Section 33 of these Regulations.

(3) Describe project vegetation / planting plans and other measures to improve the resiliency of the resource areas to provide resource area values including but not limited to wildlife habitat ~~of the resource area~~ ; that is, to enable resource areas to withstand ~~potential temperature and rainfall changes (drought and excess)~~ extreme precipitation / rainfall changes (drought and excess) and extreme temperatures including extreme heat due to climate change. See Vegetation Removal and Replacement Section 24 of these Regulations.

(4) Describe measures to protect proposed structures and minimize damage to existing and proposed structures due to the impacts of climate change.

The evaluation of climate change impacts and discussion should incorporate the principles and guidelines from the following materials:

Town of Arlington Hazard Mitigation Plan 2020 Update, Section 8: Hazard Mitigation Strategy and Appendix A: Hazard Mapping
https://www.arlingtonma.gov/home/showdocument?id=51627

TOWN OF ARLINGTON Community Resilience Building Workshop Summary of Findings & Recommendations, May 2018. https://www.arlingtonma.gov/home/showdocument?id=43409

Resilient MA, Climate Change Clearinghouse for the Commonwealth: includes information on MVP, State hazard Mitigation & Climate Adaptation Plan (SHMCAP), & ResilientMA

Interactive Map:
https://resilientma.org/

NOAA's National Weather Service, Hydrometeorological Design Studies Center, Precipitation Frequency Data Server (PFDS) NOAA 14 data:
https://hdsc.nws.noaa.gov/hdsc/pdfds/

Other materials
U.S. Climate Extremes Index (CEI) https://www.ncdc.noaa.gov/extremes/cei/

Comment [NS4]: What measures can folks take other than modeling stormwater using NOAA+? Will we just get folks saying "I modeled my stormwater using NOAA+ and sized my BMPs accordingly"?

Town of Arlington, Massachusetts

Request for Minor Plan Amendment

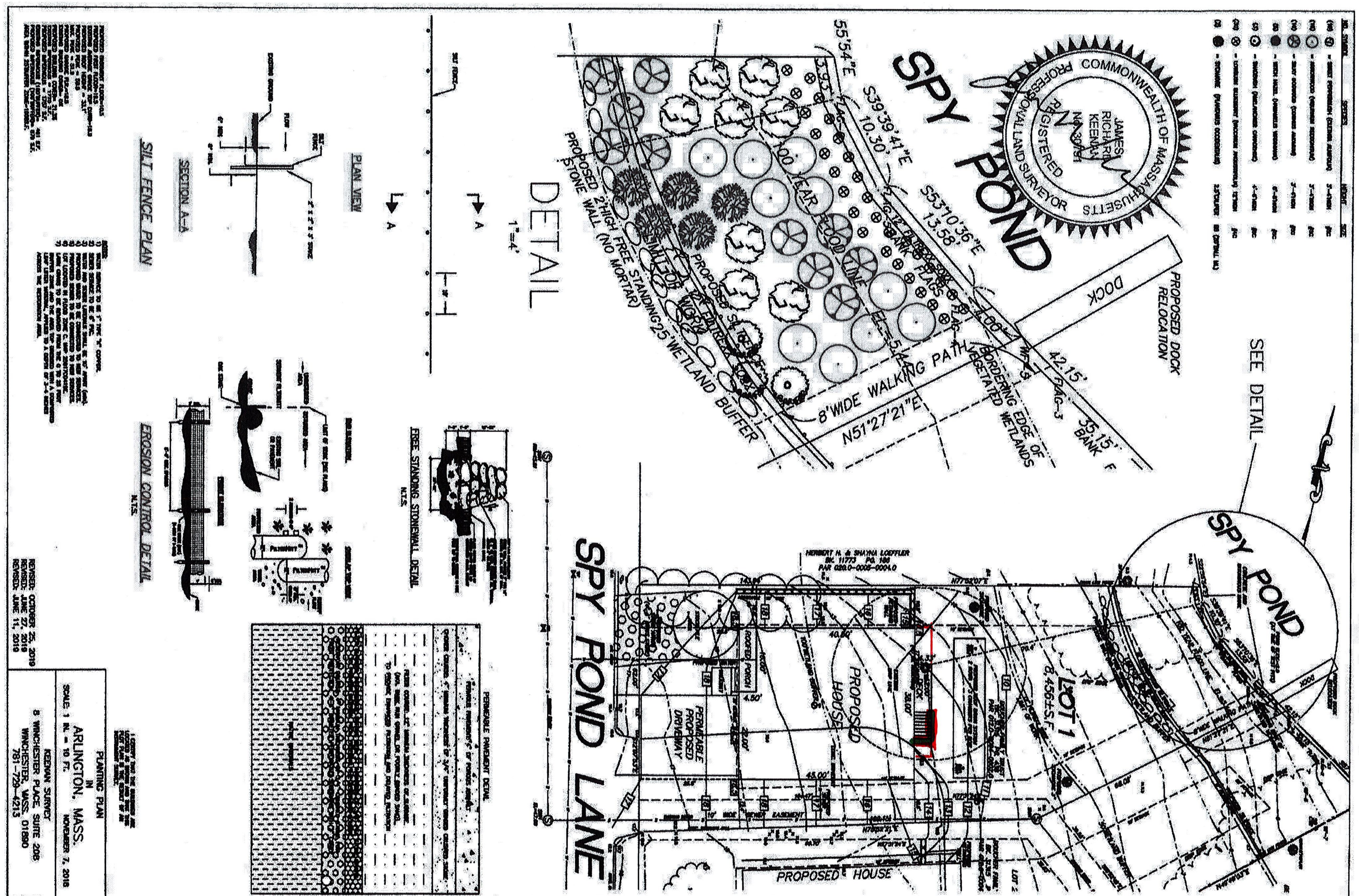
Summary:

Request for Minor Plan Amendment:49 Spy Pond Lane (previously 47 Spy Pond Lane Lot 1/A)
MassDEP File #091-0318

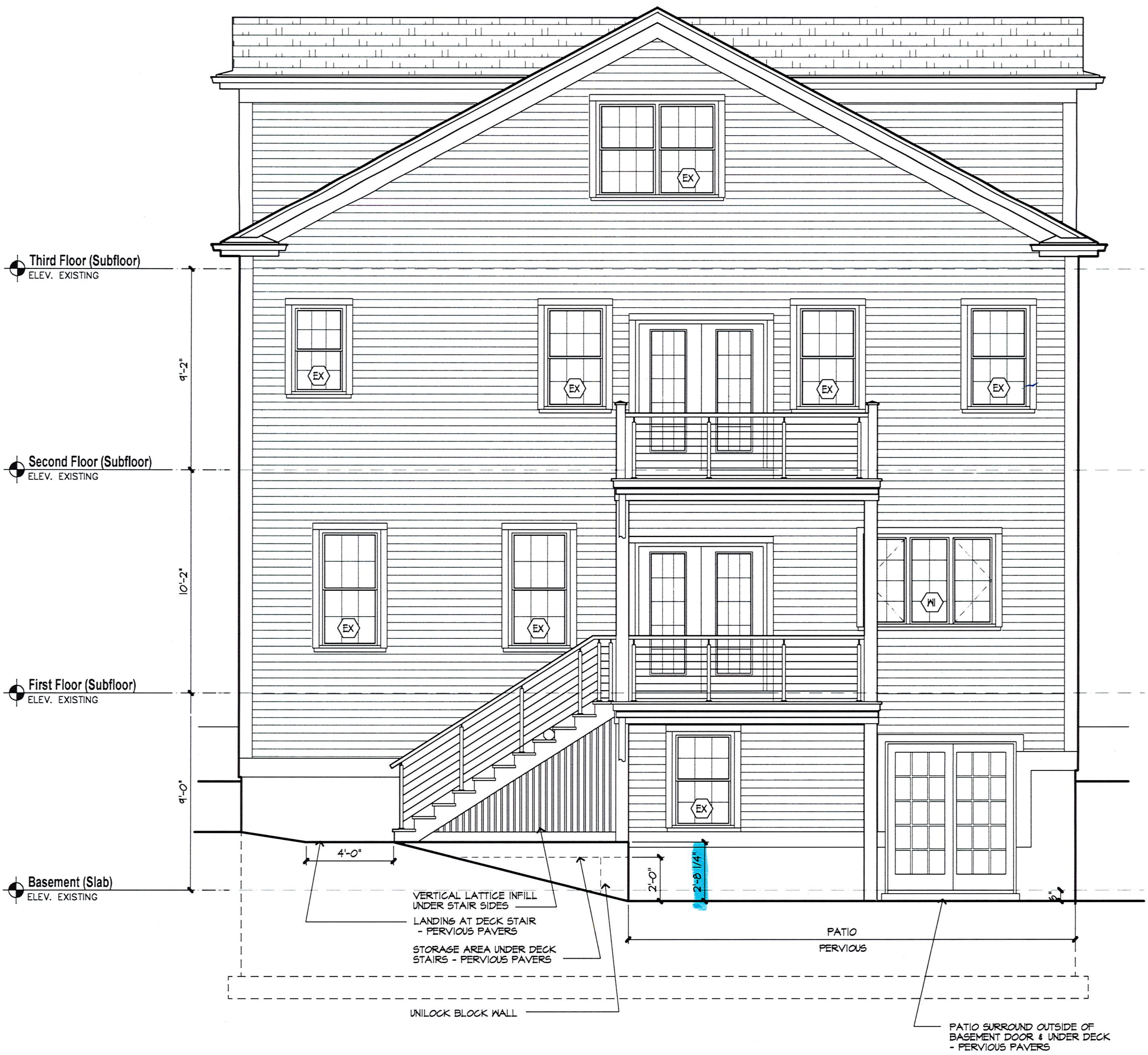
7:45pm	This minor plan modification requests installing a porous paver patio and wall behind 49 Spy Pond Lane. The proposed patio is in line with the approved porch, and would not extend beyond the porch.

ATTACHMENTS:

Type	File Name	Description
Order of Conditions	49_Spy_Pond_Lane_Plot_Plan_with_Proposed_Patio.pdf	49 Spy Pond Lane_Proposed Patio Plot Plan
Order of Conditions	49_Spy_Pond_Lane_Proposed_patio.pdf	49 Spy Pond Lane_Proposed Patio
Order of Conditions	49_SPL_UniLock_Thornbury_Permeable_Pavers.pdf	49 Spy Pond Lane Permeable Pavers 1
Order of Conditions	49_SPL_Permeable_Paving___Unilock.pdf	49 Spy Pond Lane Permeable Pavers 2
Order of Conditions	47SPL_Lot_1_Recorded_OOC.pdf	49 Spy Pond Lane OOC
Order of Conditions	47SPL_Lot_1_Proposed_Plan.pdf	49 Spy Pond Lane Proposed Plan
Order of Conditions	47SPL_Lot_1_Planting_Plan.pdf	49 Spy Pond Lane Planting Plan

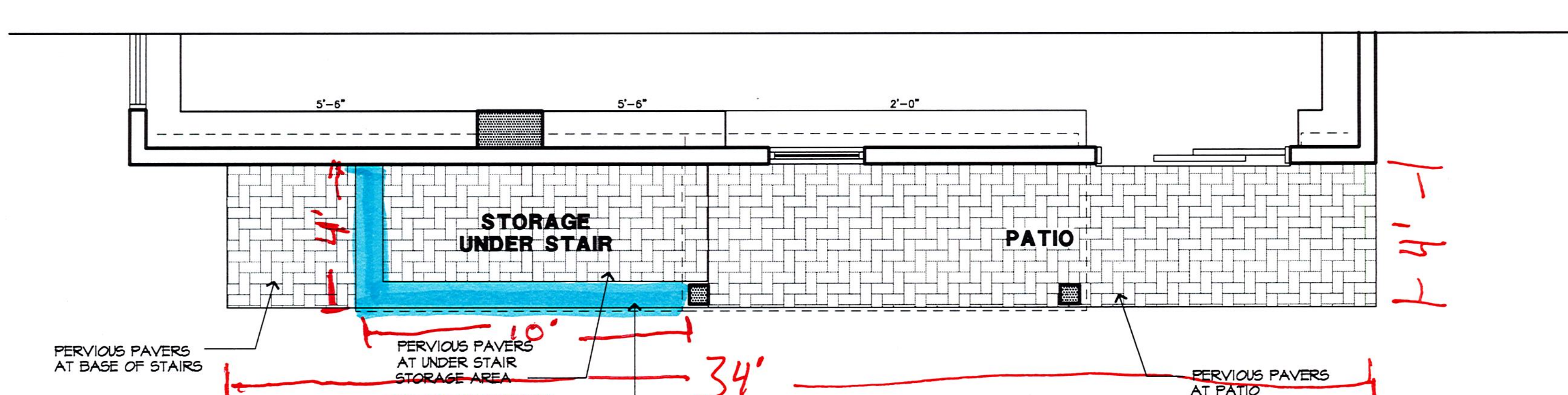


SPY POND
COMMONWEALTH OF MASSACHUSETTS
JAMES RICHARD KEENAN
REGISTERED PROFESSIONAL LAND SURVEYOR
SEE DETAIL
PROPOSED DOCK RELOCATION
DOCK
DETAIL
1"=4'
S39°39'41"E 10.30'
S53°10'36"E 13.58'
100 YEAR FLOOD LINE
8'WIDE WALKING PATH
N51°27'21"E
BORDERING EDGE OF VEGETATED WETLANDS
PROPOSED 2'HIGH FREE STANDING STONE WALL (NO MORTAR)
25'WETLAND BUFFER
SPY POND LANE
LOT 1
8,456 S.F.
PROPOSED HOUSE
PERMEABLE PROPOSED DRIVEWAY
PLAN VIEW
SECTION A-A
SILT FENCE PLAN
EROSION CONTROL DETAIL
FREE STANDING STONEWALL DETAIL
PERMEABLE PAVEMENT DETAIL
PLANTING PLAN
IN
ARLINGTON, MASS.
SCALE: 1 IN. = 10 FT.
NOVEMBER 7, 2018
KEENAN SURVEY
8 WINCHESTER PLACE, SUITE 208
WINCHESTER, MASS. 01890
781-729-4213
REVISED: OCTOBER 25, 2019
REVISED: JUNE 27, 2019
REVISED: JUNE 11, 2019



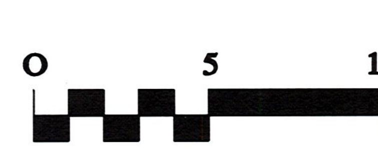
REAR ELEVATION

3/16" = 1'-0"



PARTIAL PLAN @ PATIO

3/16" = 1'-0"



SCALE: 3/16" = 1'-0"

HM ARCHITECTS
611 MAIN STREET, SUITE 300
WINCHESTER, MA 01890
v.781.729.3700 f.781.729.3672
email: cmulhern@hmarchitects.com

MORGAN RESIDENCE
49 SPY POND LANE
ARLINGTON, MASSACHUSETTS

DECK & PATIO REAR ELEVATION & PARTIAL PLAN

SK-7
12.18.20


Thornbury™ and Thornbury™ Smooth

Thornbury™

ENDURACOLOR™

					
ALMOND GROVE	BAVARIAN BLEND	NEW YORK BLEND	STEEL MOUNTAIN NEW	BAVARIAN BLEND NEW SMOOTH FINISH	STEEL MOUNTAIN NEW SMOOTH FINISH

	Bundle Type	RANDOM	RANDOM - SMOOTH
	Thickness (mm)	70MM	70MM
	Dimension mm		
	Dimension Imperial		
SQFT PER	Bundle	88.61	88.61
	Layer	11.08000	11.08000
	Section		
	Stone	0.92	0.92
PER BUNDLE	Layers	8.00	8.00
	Sections		
SOLDIER LNFT PER	SqFt	-	-
	Section	-	-
	Layer	-	-
	Bundle	-	-
SAILOR LNFT PER	SqFt	-	-
	Section	-	-
	Layer	-	-
	Bundle	-	-
UNITS PER	SqFt	1.08	1.08
	Section		
	Bundle	96.00	96.00
LBS PER	Layer	365	355
	Section		
	Bundle	2,922	2,838

3 UNIT RANDOM BUNDLE

LARGE RECTANGLE
16½ x 13¾ x 2¾"
420 x 350 x 70mm

MEDIUM RECTANGLE
13½ x 8¼ x 2¾"
350 x 210 x 70mm

SMALL RECTANGLE
8¼ x 6⅞ 2¾"
210 x 173 x 70mm

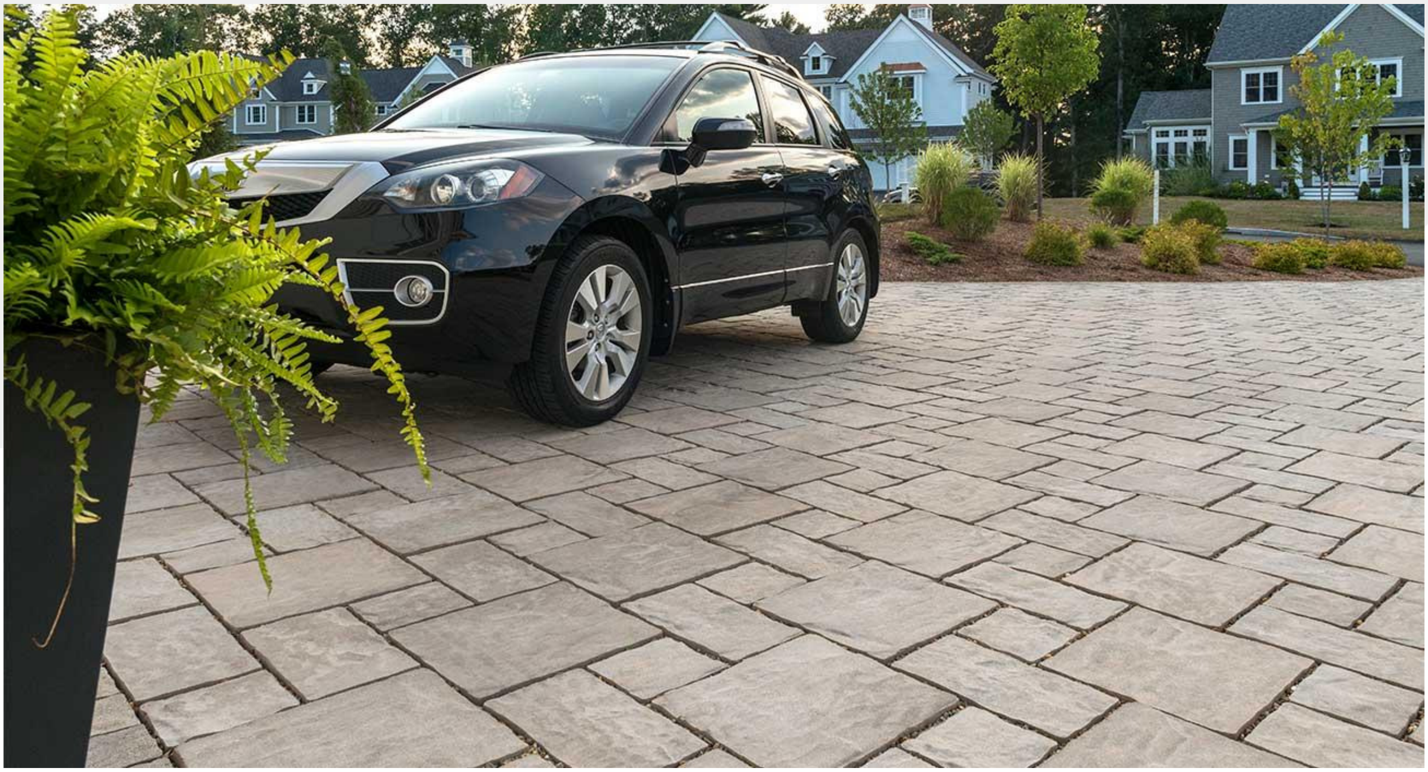
ADVANTAGES

PERMEABLE
Can be installed to allow water to flow through

DRIVE FRIENDLY
Can handle vehicular loads

Notes: **Sold in full bundles only**. Permeable - can be installed to allow water to flow through. All measurements are nominal. Important: Textured surfaces require a buffer between the plate compactor and the paver surface to prevent scuffing.

UNILOCK



A Greener Choice: Advantages of Permeable Paving

You may not think of concrete pavers as an eco-friendly product. But more and more homeowners are discovering the environmental benefits of permeable pavers. Not only are they durable and aesthetically pleasing, they can play an important role in the management and conservation of rainwater.

Here's why permeable pavers make sense in our green-conscious environment:

Reduce water in storm drains – When it rains, all of that water literally goes down the drain into sewer systems, which can get overstressed in a major storm event. Permeable pavers help to reduce the amount of water flowing into storm drains, and alleviate the pressure on sewer infrastructure.

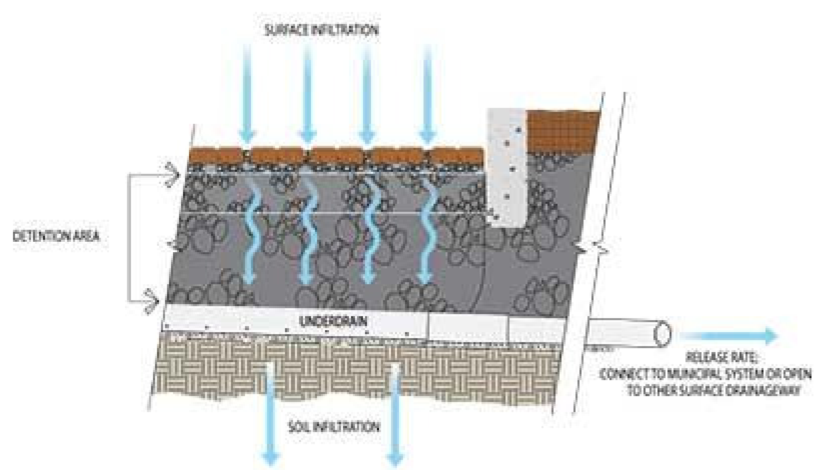
Keep pollutants out of streams … with it litter and … improve the quality of water runoff by naturally filtering pollutants out before rainwater gets to the waterways.

Help meet restrictions on impervious surfaces – Municipalities are placing limits on the impervious surface space you are allowed on your property. Some are imposing a stormwater tax based on the amount of impervious surface you have. With permeable pavers you can have a large patio, pool deck or driveway, and possibly even save money.

Allow you to harvest rainwater for your own use – A rainwater collection system can be installed beneath your paver project to supply water to inground sprinkler systems or for other water uses.

How permeable pavers work

The shape of the paver allows for larger gaps between the stones, which in turn permits water to rapidly drain through the surface into a gravel base. The gravel serves as a filtration system that reduces and removes pollutants from the water before it is naturally absorbed back into the ecosystem.



Middlesex South Registry of Deeds

Electronically Recorded Document

This is the first page of the document - Do not remove

Recording Information

Document Number	: 77583
Document Type	: ORD
Recorded Date	: May 21, 2020
Recorded Time	: 02:32:47 PM
Recorded Book and Page	: 74724 / 387
Number of Pages(including cover sheet)	: 24
Receipt Number	: 2464291
Recording Fee	: $105.00

Middlesex South Registry of Deeds
Maria C. Curtatone, Register
208 Cambridge Street
Cambridge, MA 02141
617-679-6300
www.middlesexsouthregistry.com

475PL Lot 1/A
3/31/5/438

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
091-0318
MassDEP File #

eDEP Transaction #

Arlington
City/Town

A. General Information

Please note: this form has been modified with added space to accommodate the Registry of Deeds Requirements

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

1. From: Arlington
Conservation Commission

2. This issuance is for (check one): a. ☒ Order of Conditions b. ☐ Amended Order of Conditions

3. To: Applicant:

Scott
a. First Name

Seaver
b. Last Name

Seaver Construction
c. Organization

215 Lexington Street
d. Mailing Address

Woburn
e. City/Town

MA
f. State

01801
g. Zip Code

4. Property Owner (if different from applicant):

a. First Name

b. Last Name

c. Organization

d. Mailing Address

e. City/Town

f. State

g. Zip Code

5. Project Location:

47 Spy Pond Lane (Lot1/LotA)
a. Street Address

Arlington
b. City/Town

12-4-2
c. Assessors Map/Plat Number

d. Parcel/Lot Number

Latitude and Longitude, if known: d m s
d. Latitude

d m s
e. Longitude

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
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Arlington
City/Town

A. General Information (cont.)

6. Property recorded at the Registry of Deeds for (attach additional information if more than one parcel):

Middlesex South	
a. County	b. Certificate Number (if registered land)
73606	227
c. Book	d. Page

7. Dates:

2/21/2020	4/16/2020	5/12/2020
a. Date Notice of Intent Filed	b. Date Public Hearing Closed	c. Date of Issuance

8. Final Approved Plans and Other Documents (attach additional plan or document references as needed):

"Proposed Site Plan in Arlington, Mass." showing Lot
a. Plan Title

Keenan Survey of Winchester, MA	James Richard Keenan P.L.S #30751
b. Prepared By	c. Signed and Stamped by
June 27, 2019	1:10
d. Final Revision Date	e. Scale
See Findings and Special Conditions	various
f. Additional Plan or Document Title	g. Date

B. Findings

1. Findings pursuant to the Massachusetts Wetlands Protection Act:

Following the review of the above-referenced Notice of Intent and based on the information provided in this application and presented at the public hearing, this Commission finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act (the Act). Check all that apply:

a. ☒ Public Water Supply b. ☐ Land Containing Shellfish c. ☒ Prevention of Pollution

d. ☒ Private Water Supply e. ☐ Fisheries f. ☒ Protection of Wildlife Habitat

g. ☒ Groundwater Supply h. ☐ Storm Damage Prevention i. ☐ Flood Control

2. This Commission hereby finds the project, as proposed, is: (check one of the following boxes)

Approved subject to:

a. ☒ the following conditions which are necessary in accordance with the performance standards set forth in the wetlands regulations. This Commission orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.

Massachusetts Department of Environmental Protection
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City/Town

B. Findings (cont.)

Denied because:

b. ☐ the proposed work cannot be conditioned to meet the performance standards set forth in the wetland regulations. Therefore, work on this project may not go forward unless and until a new Notice of Intent is submitted which provides measures which are adequate to protect the interests of the Act, and a final Order of Conditions is issued. **A description of the performance standards which the proposed work cannot meet is attached to this Order.**

c. ☐ the information submitted by the applicant is not sufficient to describe the site, the work, or the effect of the work on the interests identified in the Wetlands Protection Act. Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides sufficient information and includes measures which are adequate to protect the Act's interests, and a final Order of Conditions is issued. **A description of the specific information which is lacking and why it is necessary is attached to this Order as per 310 CMR 10.05(6)(c).**

3. ☒ Buffer Zone Impacts: Shortest distance between limit of project disturbance and the wetland resource area specified in 310 CMR 10.02(1)(a) — 74.4 a. linear feet

Inland Resource Area Impacts: Check all that apply below. (For Approvals Only)

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
4. ☐ Bank	a. linear feet	b. linear feet	c. linear feet	d. linear feet
5. ☐ Bordering Vegetated Wetland	a. square feet	b. square feet	c. square feet	d. square feet
6. ☐ Land Under Waterbodies and Waterways	a. square feet	b. square feet	c. square feet	d. square feet
	e. c/y dredged	f. c/y dredged		
7. ☐ Bordering Land Subject to Flooding	a. square feet	b. square feet	c. square feet	d. square feet
Cubic Feet Flood Storage	e. cubic feet	f. cubic feet	g. cubic feet	h. cubic feet
8. ☐ Isolated Land Subject to Flooding	a. square feet	b. square feet		
Cubic Feet Flood Storage	c. cubic feet	d. cubic feet	e. cubic feet	f. cubic feet
9. ☐ Riverfront Area	a. total sq. feet	b. total sq. feet		
Sq ft within 100 ft	c. square feet	d. square feet	e. square feet	f. square feet
Sq ft between 100-200 ft	g. square feet	h. square feet	i. square feet	j. square feet

Massachusetts Department of Environmental Protection
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City/Town

B. Findings (cont.)

Coastal Resource Area Impacts: Check all that apply below. (For Approvals Only)

	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
10. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below			
11. ☐ Land Under the Ocean	a. square feet	b. square feet		
	c. c/y dredged	d. c/y dredged		
12. ☐ Barrier Beaches	Indicate size under Coastal Beaches and/or Coastal Dunes below			
13. ☐ Coastal Beaches	a. square feet	b. square feet	cu yd c. nourishment	cu yd d. nourishment
14. ☐ Coastal Dunes	a. square feet	b. square feet	cu yd c. nourishment	cu yd d. nourishment
15. ☐ Coastal Banks	a. linear feet	b. linear feet		
16. ☐ Rocky Intertidal Shores	a. square feet	b. square feet		
17. ☐ Salt Marshes	a. square feet	b. square feet	c. square feet	d. square feet
18. ☐ Land Under Salt Ponds	a. square feet	b. square feet		
	c. c/y dredged	d. c/y dredged		
19. ☐ Land Containing Shellfish	a. square feet	b. square feet	c. square feet	d. square feet
20. ☐ Fish Runs	Indicate size under Coastal Banks, Inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above			
	a. c/y dredged	b. c/y dredged		
21. ☐ Land Subject to Coastal Storm Flowage	a. square feet	b. square feet		
22. ☐ Riverfront Area	a. total sq. feet	b. total sq. feet		
Sq ft within 100 ft	c. square feet	d. square feet	e. square feet	f. square feet
Sq ft between 100-200 ft	g. square feet	h. square feet	i. square feet	j. square feet

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
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City/Town

B. Findings (cont.)

* #23. If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.5.c (BVW) or B.17.c (Salt Marsh) above, please enter the additional amount here.

23. ☐ Restoration/Enhancement *:

a. square feet of BVW ______ b. square feet of salt marsh ______

24. ☐ Stream Crossing(s):

a. number of new stream crossings ______ b. number of replacement stream crossings ______

C. General Conditions Under Massachusetts Wetlands Protection Act

The following conditions are only applicable to Approved projects.

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
   a. The work is a maintenance dredging project as provided for in the Act; or
   b. The time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.
   c. If the work is for a Test Project, this Order of Conditions shall be valid for no more than one year.
5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order. An Order of Conditions for a Test Project may be extended for one additional year only upon written application by the applicant, subject to the provisions of 310 CMR 10.05(11)(f).
6. If this Order constitutes an Amended Order of Conditions, this Amended Order of Conditions does not extend the issuance date of the original Final Order of Conditions and the Order will expire on 05/12/2023 unless extended in writing by the Department.
7. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.

C. General Conditions Under Massachusetts Wetlands Protection Act

8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.

9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work.

10. A sign shall be displayed at the site not less then two square feet or more than three square feet in size bearing the words,

    "Massachusetts Department of Environmental Protection" [or, "MassDEP"]

    "File Number 091-0318 "

11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before MassDEP.

12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.

13. The work shall conform to the plans and special conditions referenced in this order.

14. Any change to the plans identified in Condition #13 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.

15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.

16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.

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C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.

18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.

19. The work associated with this Order (the "Project")
    (1) ☐ is subject to the Massachusetts Stormwater Standards
    (2) ☒ is NOT subject to the Massachusetts Stormwater Standards

    If the work is subject to the Stormwater Standards, then the project is subject to the following conditions:

    a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Construction General Permit as required by Stormwater Condition 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.

    b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that:
    i. all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures;
    ii. as-built final construction BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized;
    iii. any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10;

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C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

iv. all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition;

v. any vegetation associated with post-construction BMPs is suitably established to withstand erosion.

c) The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 18(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement) for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMP Operation and Maintenance Plan ("O&M Plan") and certifying the following:

i.) the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and

ii.) the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.

d) Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Multi-Sector General Permit.

e) Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 18(f) through 18(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 18(f) through 18(k) with respect to that BMP shall be a violation of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.

f) The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.

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C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

g) The responsible party shall:
1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.

h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.
i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.
j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.
k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.

l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.

Special Conditions (if you need more space for additional conditions, please attach a text document):
See Attached Findings and Conditions

20. For Test Projects subject to 310 CMR 10.05(11), the applicant shall also implement the monitoring plan and the restoration plan submitted with the Notice of Intent. If the conservation commission or Department determines that the Test Project threatens the public health, safety or the environment, the applicant shall implement the removal plan submitted with the Notice of Intent or modify the project as directed by the conservation commission or the Department.

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D. Findings Under Municipal Wetlands Bylaw or Ordinance

1. Is a municipal wetlands bylaw or ordinance applicable? ☐ Yes ☒ No

2. The ______________________ hereby finds (check one that applies):
Conservation Commission

a. ☐ that the proposed work cannot be conditioned to meet the standards set forth in a municipal ordinance or bylaw, specifically:

1. Municipal Ordinance or Bylaw ______ 2. Citation ______

Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides measures which are adequate to meet these standards, and a final Order of Conditions is issued.

b. ☐ that the following additional conditions are necessary to comply with a municipal ordinance or bylaw:

1. Municipal Ordinance or Bylaw ______ 2. Citation ______

3. The Commission orders that all work shall be performed in accordance with the following conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, the conditions shall control.
The special conditions relating to municipal ordinance or bylaw are as follows (if you need more space for additional conditions, attach a text document):
This project was approved under the Arlington Bylaw for Wetlands Protection and issued a permit on 10/18/2019.

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E. Signatures

This Order is valid for three years, unless otherwise specified as a special condition pursuant to General Conditions #4, from the date of issuance.

5/12/2020
1. Date of Issuance

Please indicate the number of members who will sign this form.
This Order must be signed by a majority of the Conservation Commission.

4
2. Number of Signers

The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate Department of Environmental Protection Regional Office, if not filing electronically, and the property owner, if different from applicant.

Signatures:

☐ by hand delivery on

Date

☒ by certified mail, return receipt requested, on
5/12/2020
Date

F. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate MassDEP Regional Office to issue a Superseding Order of Conditions. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order, or providing written information to the Department prior to issuance of a Superseding Order.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40), and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal ordinance or bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.

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G. Recording Information

Prior to commencement of work, this Order of Conditions must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on this page shall be submitted to the Conservation Commission listed below.

Arlington
Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

To:

Arlington
Conservation Commission

Please be advised that the Order of Conditions for the Project at:

47 Spy Pond Lane (Lot1/LotA)
Project Location

091-0318
MassDEP File Number

Has been recorded at the Registry of Deeds of:

Middlesex South
County

73606
Book

227
Page

for: Scott Seaver, Seaver Construction
Property Owner

and has been noted in the chain of title of the affected property in:

Book

Page

In accordance with the Order of Conditions issued on:

05/12/2020
Date

If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number

Signature of Applicant

ARLINGTON CONSERVATION COMMISSION
APPROVAL ORDER OF CONDITIONS – 47 SPY POND LANE – LOT 1(A)
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DOCUMENTS REVIEWED

1. Notice of Intent for work at 47 Spy Pond Lane (Lot 1/Lot A), Arlington, MA, signed July 9, 2019 by Mary Trudeau; Applicant: Scott Seaver of Seaver Construction, Woburn, MA and Representative: Mary Trudeau of Lexington, MA, and including:
    a. "Description of Work - Notice of Intent Filing", undated (5 pages).
    b. June 28, 2016 Drainage Analysis for 47 Spy Pond Lane Lot 1/A conducted by Alan Engineering LLC.
    c. October 29, 2013 letter from Division of Fisheries and Wildlife and Natural Heritage and Endangered Species Program map of site.
    d. Construction Period Stormwater Operation and Maintenance Plan, 47 Spy Pond Lane (Lot 1/A), undated (4 pages).
    e. Post-Construction Construction Stormwater Operation & Maintenance Plan, 47 Spy Pond Lane (Lot 1/A), undated (3 pages).
    f. MassDEP Superseding Order of Conditions/Approval Cover Letter (3 pages).
    g. MassDEP Superseding Order of Conditions/Approval Permit and Special Conditions (15 pages).

2. "Proposed Site Plan in Arlington, Mass." showing Lot 1 by Keenan Survey of Winchester, MA, scale 1:10, dated November 7, 2018, revised June 27, 2019, stamped by James Richard Keenan, P.L.S #30751.

3. "Planting Plan in Arlington, Mass." showing Lot 1 by Keenan Survey of Winchester, MA, scale 1:10, dated November 7, 2018, revised June 27, 2019, by James Richard Keenan, P.L.S #30751.

4. All relevant documents submitted during the prior hearings and working session(s) for which the Commission approved this project under the Arlington Bylaw for Wetlands Protection on 10/18/2019 are incorporated by reference.

PROCEEDINGS

The Conservation Commission held hearings on the Notices of Intent filed under the Massachusetts Wetlands Protection Act only on March 5 and April 2, 2020. The Commission closed the public hearing on April 2, 2020, and deliberated on April 16, 2020 and May 7, 2020.

On May 7, 2020, the Commission voted 5-1-0 to approve the Project with conditions under the Massachusetts Wetlands Protection Act (the "Act").

Hearings and deliberations for 47 Spy Pond Lane Lots A(1) and B(2) were performed together; however, two separate decisions were rendered, consistent with the two separate filings for Lot A(1) and Lot B(2).

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The existing dock at the property of Lot A(1) is subject to a separate permit proceeding; however, the Commission did add a Special Condition #62 concerning placement of this dock.

FINDINGS OF FACT AND LAW
UNDER MASSACHUSETTS WETLANDS PROTECT ACT

A. The Applicant filed a Notice of Intent under the Massachusetts Wetlands Protection Act only because the Superseding Order of Conditions issued in late 2016 had expired; as such, these findings do not consider the Arlington Bylaw for Wetlands Protection and regulations thereunder.

B. The Commission approved this project under the Arlington Bylaw for Wetlands Protection (the "Bylaw") on 10/18/2019.

C. The Commissions finds that the property at 47 Spy Pond Lane is currently, and has been for 50 or more continuous years, considered and managed as a single parcel with an existing house (vacant due to a fire) and large paved driveway to the north. The property is approximately 18,300 square feet along the shoreline of Spy Pond. The existing house and all but 789 (491 lot 1+ 298 lot 2) sq. ft. of the existing expansive driveway are beyond 100 feet from Spy Pond so the existing house and most of the existing driveway are outside of the Commission's jurisdiction.

D. The Applicant represents that the existing historical lot can be divided into two new conforming lots under zoning. The Applicant thus filed a Notice of Intent (NOI) for each proposed Lot. Lot 1, also called Lot A, consists of the majority of the existing paved driveway, lawn area, trees and shrubs. Lot 1/A is approximately 8,452 square feet. A separate decision for approval was made for Lot 2(B) under the Bylaw on 12/21/2018.

E. This Order of Conditions is only for work proposed and allowed on Lot 1/A. Work proposed on Lot 2/B is covered under a different Order of Conditions.

F. 47 Spy Pond Lane slopes downward and toward Spy Pond which borders the property on the north. Resource Areas under the Bylaw on or within 100 feet of the property of Lot 1(A) are: Land Under Water Body, Bordering Land Subject to Flooding, Bank, and Wetlands Buffer.

G. The Commission finds the delineation of the Resource Areas shown on the latest revised plans to be accurate.

H. The Town of Arlington holds a sewer easement through the 47 Spy Pond Lane property in which it has placed a sewer line serving the neighborhood. Its location is shown on several plans.

I. The Commission finds that the Resource Areas on Lot 1(A) are significant to the Resource Area values protected by the Act, as specified in the Regulations for each Resource Area.

J. Spy Pond is an approximately 100-acre pond that is teaming with wildlife and enjoyed by many Arlington residents. Spy Pond Park is one of the most used parks in Arlington. The Arlington Boys and Girls Club also borders the shoreline and uses the Pond for many activities. The Town over the years has funded efforts to reduce and manage invasive aquatic plant species in Spy Pond. Many groups in Arlington advocate for the preservation of Spy Pond and work to improve its water quality, including the Arlington Conservation Commission, Spy Pond Committee, Friends of Spy Pond Park, and the Arlington Land Trust.

K. The Notice of Intent for Lot 1(A) proposes construction of a single-family house and related appurtenances including an underground stormwater infiltration device. The house footprint will be approximately 1,757 square feet with the closest point of the dwelling (excluding the deck) proposed to be approximately 74.4-feet from the edge of Spy Pond. Work proposed also includes grading and construction of a retaining wall next to the house, the addition of a native planting area within 25-feet from the Pond with an 8-foot wide lawn path through the Wetlands Buffer down to the Pond along the edge of the property. A freestanding field stone unmortared and dry laid wall would be constructed 25-feet from the Pond to surround the proposed 25-foot planting area. The Applicant proposes planting two 3-inch diameter-at-breast height (dbh) trees to mitigate the removal of one mature sycamore tree that would have to be removed for construction of the house. The proposal also includes installing an offsite stormwater treatment unit at the corner of Princeton Road and Alfred Road to treat stormwater from an approximately 1.55 acre watershed area for off-site mitigation, within the Spy Pond watershed.

L. The Commission finds that the existing impervious surface on the proposed Lot 1(A) is 491 square feet within the Wetlands Buffer and that the project proposed to increase the impervious surface to 879 square feet, a net increase of 388 square feet within the 50 – 100 foot portion of the Wetlands Buffer.

M. As for work in the Wetlands Buffer, the Commission finds that the Applicant has demonstrated that there are no available or practical alternatives available with less impact to wetlands resource areas. The Applicant has significantly reduced the footprint of the house from the Applicant's first Notice of Intent filed in 2016, its second Notice of Intent filed in 2017, and its third Notice of Intent filed in 2018. The proposed house is

approximately 74.4 feet from the boundary of Spy Pond, compared to the current impervious concrete driveway which is 68 feet from the pond. Therefore, impervious surface will be pushed approximately 6 feet back from the pond through the project. Thus, as proposed, this project would reduce intrusion into the 100-foot Buffer Zone compared to prior submittals from 2016 through 2018. The proposed project also mitigates more stormwater runoff than needed for the size of the house, restores a 25-ft wide vegetated buffer adding habitat value which currently does not exist, and contributes to a larger watershed's stormwater management with the installation of an offsite stormwater unit that will help improve water quality in Spy Pond. These, among others, are further detailed in Findings N through S, below.

N. The two infiltration chambers will have the capacity for an approximately 30% larger house originally proposed in 2017 even though the current proposed house will now be smaller. This added capacity further protects the interests of the Act by providing more than sufficient infiltration of roof runoff, meaning there will be less overland stormwater flow across the property into Spy Pond.

O. During construction, erosion and sediment controls will serve to protect the Wetlands Buffer and Spy Pond resource areas.

P. The proposed 25-foot wide area of native plantings close to Spy Pond will enhance wildlife habitat by providing more plant material for wildlife foraging, escape cover, over-wintering, and breeding. Currently, this area is lawn. The vegetated buffer will also help to protect the water quality of Spy Pond by slowing down stormwater runoff and bringing greater stability to the bank and areas immediately adjacent to Spy Pond. The Applicant agrees to construct an unmortered, dry-laid stone wall as a boundary to this vegetative buffer area.

Q. The Applicant agrees to pursue a waterways license modification to relocate the dock currently on Lot 1(A), to run perpendicular to and straddle the property line between Lot 1(A) and Lot 2(B). Moving the dock to the proposed boundary between Lot 1 and Lot 2 as a shared dock will further protect the bank of Spy Pond by reducing the number of access points that may result in bank erosion and sediment entering Spy Pond.

R. The Applicant agrees to purchase and install off-site mitigation stormwater Vortechnics 2000 water quality treatment unit at the intersection of Princeton Road and Alfred Road. The Town will maintain it per conversations with the Town Engineer. The Town of Arlington shall take over the maintenance of the unit per the conservations documented with the Town Engineer, only when the Town Engineer is satisfied with the function of the unit. The off-site unit shall be installed and accepted by Arlington Department of Public Works within 12 months of the issuance of the Order of Conditions.

S. The Applicant agrees to install a pervious driveway and walkway although outside of the Conservation Commission's jurisdiction. The Applicant agrees to put in a deed restriction that these surfaces are to remain pervious.

CONCLUSION

The Commission finds that the proposed work on Lot 1(A) has the potential to individually and/or cumulatively harm the resource area values protected by the Act if not adequately regulated, but can proceed here given the mitigation provided and implementation of the conditions specified herein.

Based on the testimony at the public hearings, and review of the application materials and the documents listed above submitted during the public hearings, the Commission concludes that the proposed Project as conditioned will not have significant or cumulative effects upon the interests of the Resource Area values of the Massachusetts Wetlands Protect Act when the conditions imposed are implemented to protect the Resource Area values. With the conditions contained herein, the Project meets the performance standards in the Act.

For the foregoing reasons, the Commission approves under the Act with the conditions stated herein the applications for work on 47 Spy Pond Lane Lot 1(A).

ADDITIONAL SPECIAL CONDITIONS

In addition to the General Conditions (numbered 1 – 20 above), the Project is subject to the following Additional Special Conditions (under the Act):

Pre-Construction

21. Work permitted by this Order and Permit shall conform to the Notice of Intent, the approved plans and documents (listed above), and oral representations (as recorded in hearing minutes) submitted or made by the Applicant and the Applicant's agents or representatives, as well as any plans and other data, information or representations submitted per these Conditions and approved by the Commission.

22. The provisions of this Order and Permit shall apply to and be binding upon the Applicant and Applicant's assignees, tenants, property management company, employees, contractors, and agents.

23. No work shall be started under this Order until: (a) all other required permits or approvals have been obtained and (b) the appeal period of ten (10) business days from the date of issue of this Order has expired without any appeal being filed and (c) this

Order has been recorded in the Registry of Deeds. No work shall be started under this Permit until all other necessary permits or approvals have been obtained.

24. The Applicant shall ensure that a copy of this Order of Conditions and Permit for work, with any referenced plans, is available on-site at all times, and that contractors, site managers, foremen, and sub-contractors understand its provisions.

25. Prior to starting work, the Applicant shall submit to the Commission the names and 24-hour phone numbers of project managers or the persons responsible for site work or mitigation.

26. Before work begins, erosion and sediment controls shall be installed at the limits of the work area and as depicted in the approved plans. These will include a silt fence and 12-inch straw or silt wattle around the entire work area (hay bales are not allowed and silt socks are preferred).

27. The contractor shall contact the Conservation Agent (concomm@town.arlington.ma.us ; 781-316-3012) to arrange for a pre-construction meeting with the on-site project manager to walk through the Order of Conditions, confirm the wash out location, and walk the site to confirm the installation and placement of erosion controls prior to the start of any grading or construction work.

28. At least 21 days prior to construction, the Applicant shall submit revised planting, foundation, retaining wall, pervious surfaces plans reflecting any additions, additional details, and changes from the June 11, 2019 plans referenced in this Order of Conditions to the Commission for approval.

29. At least 21 days prior to the start of any construction on Lot 1/A, the Applicant shall submit a signed agreement between the Town of Arlington and Seaver Construction for the acceptance and maintenance of the off-site stormwater treatment unit.

30. The contractor shall provide written Notice of the work start date to the Conservation Agent 48 hours prior to start of work.

31. The Commission, its employees, and its agents shall have the right of entry onto the site to inspect for compliance with the terms of this Order of Conditions and Permit until a Certificate of Compliance has been issued.

32. Within 30 days of completion of the installation of the concrete foundation, the Applicant shall submit an as-built plan, stamped by a Professional Engineer or

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Registered Land Surveyor, to the showing distances from property lines and Bank and Bordering Vegetated Wetland resource areas.

33. Before the Applicant named in this Order sells or conveys either Lot 1/A or Lot 2/B whichever occurs first, the Applicant shall submit for Conservation Commission approval a restrictive covenant that any pervious surfaces shown on the plan outside of the Commission's jurisdiction shall remain pervious. The restrictive covenant shall benefit and be enforceable by the Conservation Commission and the Town of Arlington. Before either property is sold (whichever occurs first), the restrictive covenant must be executed and recorded, and proof of recording provided to the Commission.

34. The Applicant shall include the Arlington Conservation Commission's Agent on all communication related to the necessary Chapter 91 Licensing in order to move the location of the existing dock to the boundary of Lots 1/A and 2/B. The Applicant shall not later than September 1, 2020 file a formal request to MassDEP's Waterways Division its request to relocate the dock. If MassDEP does not grant permission to relocate the dock, the Applicant shall remove it.

Environmental Monitors

35. The Applicant must hire a qualified environmental monitor to be on-site during project construction. The monitor shall submit an electronic report to the Conservation Agent twice a month regarding construction progress and relation to resource areas. The qualified environmental monitor shall also submit an electronic report after every rain event exceeding 0.5 inches of rain during the duration of construction to the Conservation Agent regarding the condition of the site during and after the rain event, as well as the status erosion controls and any additional measures to address stormwater management issues caused by said rain event.

36. The Applicant must hire a qualified planting monitor to oversee the installation of the vegetated buffer plantings installation. The qualified monitor shall be a certified landscape architect. A planting report must be submitted to the Conservation Commission within 10 days of the completion of the plant installation. The planting report shall include an as-installed plan and a list of what was planted (including Latin and common names, size of each plant, quantity of each species).

37. The Applicant must hire a qualified stormwater monitor or engineer to oversee the installation of the on-site stormwater infiltration unit, permeable pavers, and off-site stormwater mitigation unit. The qualified stormwater monitor shall be a certified engineer. A stormwater mitigation report must be submitted to the Conservation Commission within 10 days of the completion of the stormwater infiltration units and

permeable pavers installation. The stormwater report shall included as-built plans, photographs from installation, and a written summary of the installation of the on-site stormwater infiltration unit, permeable pavers, and off-site stormwater mitigation unit. The stormwater monitor shall submit separate reports for the on-site stormwater infiltration unit, permeable pavers, and off-site stormwater mitigation unit.

Post-Construction

38. When requesting a Certificate of Compliance for this Order of Conditions, the Applicant must submit a written statement from a either (1) Massachusetts professional engineer and registered land surveyor, or (2) registered land surveyor and landscape architect certifying that the completed work complies with the plans referenced in this Order, or provide an as-built plan and statement describing any differences.

39. Certification must be provided to the Commission that the Order of Conditions has been conveyed and received by any new owner of the property, so that new owners were apprised of the continuing conditions of this permit. **This shall be a continuing condition that survives the expiration of this permit.**

Dumpsters

40. All dumpsters must be covered at the end of each work day, and no dumpsters will be allowed overnight within the 100-foot Buffer Zone or other Resource Areas.

Stockpiling

41. No uncovered stockpiling of materials shall be permitted overnight within 100 feet of any waterway or water body.

Erosion

42. Areas that are disturbed by construction and access activities shall as soon as possible be brought to final grade and reseeded and restabilized, and shall be done so prior to the removal of the erosion control barrier.

Equipment

43. No heavy equipment may be stored overnight within 50 feet of the wetland and no refueling or maintenance of machinery shall be allowed within the 100-foot Buffer Zone or within any Resource Area.

44. Arrangements shall be made for any rinsing of tools, equipment, etc. associated with on–site mixing or use of concrete or other materials such that the waste water is disposed of in the concrete wash out station-at least 50 feet from the resource area. In no case may waste water be discharged into or onto Resource Areas on or adjacent to

the site. In no case may waste water be placed in storm drains. Any spillage of materials shall be cleaned up promptly.

Sweeping

45. A power-broom must be kept onsite at all times to conduct the daily workday street sweeping along the construction entrance and street within the property boundaries.

46. Any dirt or debris spilled or tracked onto any paved streets shall be swept up and removed daily with a power-broom.

Dewatering

47. Any dewatering operations shall conform to the following:
    (a) Notify the Conservation Commission that dewatering is required.
    (b) Any catch basins, drains, and outfalls to be used in dewatering operations shall be cleaned out before operations begin.
    (c) Any water discharged as part of any dewatering operation shall be passed through filters, on-site settling basins, settling tank trucks, or other devices to ensure that no observable sediments or pollutants are carried into any Resource Area, street, drain or adjacent property.
    (d) Measures shall be taken to ensure that no erosion or scouring shall occur on public or private property, or on the banks or bottoms of water bodies, as a result of dewatering operations.
    (e) No dewatering shall occur within 50 feet of the pond.

Plantings

48. All vegetated buffer plantings shall be native and be installed and maintained according to the standards of the American Association of Nurserymen (AAN) and be maintained in perpetuity. **This shall be a continuing condition that survives the expiration of the permit and shall be included in any Certificate of Compliance as a continuing condition in perpetuity.**

49. At least 21 days prior to plant installation, the Applicant shall submit an invasive plant management plan to the Conservation Commission. The plan shall focus on invasive plant management for the vegetated buffer area. **The plan's recommendations shall be performed by the Applicant and the recommendations shall be a continuing condition that survives the expiration of the permit and shall be included in any Certificate of Compliance as a continuing condition in perpetuity.**

50. The Applicant shall monitor all approved plantings for a period of three years after plant installation. The Applicant shall maintain 100% survival of all installed plantings after the

first and second year of monitoring, and maintain a 90% survival of all installed plantings after the third (final) year of monitoring.

51. The Applicant shall maintain 100% survival of the two approved replacement trees. **This shall be a continuing condition that survives the expiration of the permit and shall be included in any Certificate of Compliance as a continuing condition in perpetuity.**

52. The unmortared and dry laid stone wall approved to delineate the vegetated buffer area shall remain as unmortared and dry laid. **This shall be a continuing condition that survives the expiration of the permit and shall be included in any Certificate of Compliance as a continuing condition in perpetuity.**

53. A metal (or other permanent material) sign or marker shall be installed on or along the unmortared wall to demarcate the conservation area. Specifications and a plan for the sign shall be submitted to the Commission for approval 21 days prior to the construction of the wall. **The permanent sign or marker shall be a continuing condition that survives the expiration of the permit and shall be included in any Certificate of Compliance as a continuing condition in perpetuity.**

Chemicals

54. To avoid adding excess nitrogen runoff to Spy Pond, the Applicant shall only treat the lawn with slow release nitrogen fertilizer. Application of this fertilizer cannot occur in the summer, or after storm events. Lawn fertilizer shall only be applied twice a year, in spring and fall. No herbicides shall be used to treat invasive or unwanted plants. New plantings shall only be fertilized once, during the initial planting year. No pesticides or rodenticides shall be used to treat pest management issues within the Wetland Buffers Zone. **This shall be a continuing condition that survives the expiration of the permit and shall be included in any Certificate of Compliance as a continuing condition in perpetuity.**

Pervious Surfaces

55. Pervious surfaces shown on the project plans shall be maintained and not be replaced by impervious surfaces. **This shall be a continuing condition that survives the expiration of the permit and shall be included in any Certificate of Compliance as a continuing condition in perpetuity.**

56. The approved deck shall be constructed to facilitate stormwater infiltration below so that it acts a pervious surface. **This shall be a continuing condition that survives the expiration of the permit and shall be included in any Certificate of Compliance as a continuing condition in perpetuity.**

ARLINGTON CONSERVATION COMMISSION
APPROVAL ORDER OF CONDITIONS – 47 SPY POND LANE – LOT 1(A)
MassDEP File # 091-0318
ONLY UNDER THE WETLANDS PROTECTION ACT
05/12/2020

Stormwater Management

57. The on-site infiltration system shall be maintained according to the manufacturer best management practices and operations/maintenance plan. The system shall be checked twice a year to ensure compliance with the best management practices and operations/maintenance plan. An annual report shall be submitted to the Conservation Commission and Town Engineer demonstrating that the operation and maintenance of the unit was performed per the manufacturer best management practices. **This shall be a continuing condition that survives the expiration of the permit and shall be included in any Certificate of Compliance as a continuing condition in perpetuity.**

58. The off-site Vortechnics unit shall be purchased and installed by the Applicant at the Applicant's expense. The Town of Arlington shall take over the maintenance of the unit per the conservations documented with the Town Engineer, only when the Town Engineer is satisfied with the function of the unit. The off-site unit shall be installed and operational within 12 months of the issuance of the Order of Conditions.

59. The Applicant must obtain a letter from the Town Engineer that the off-site stormwater unit was installed properly and accepted by the Arlington Department of Public Works, and send it to the Commission.

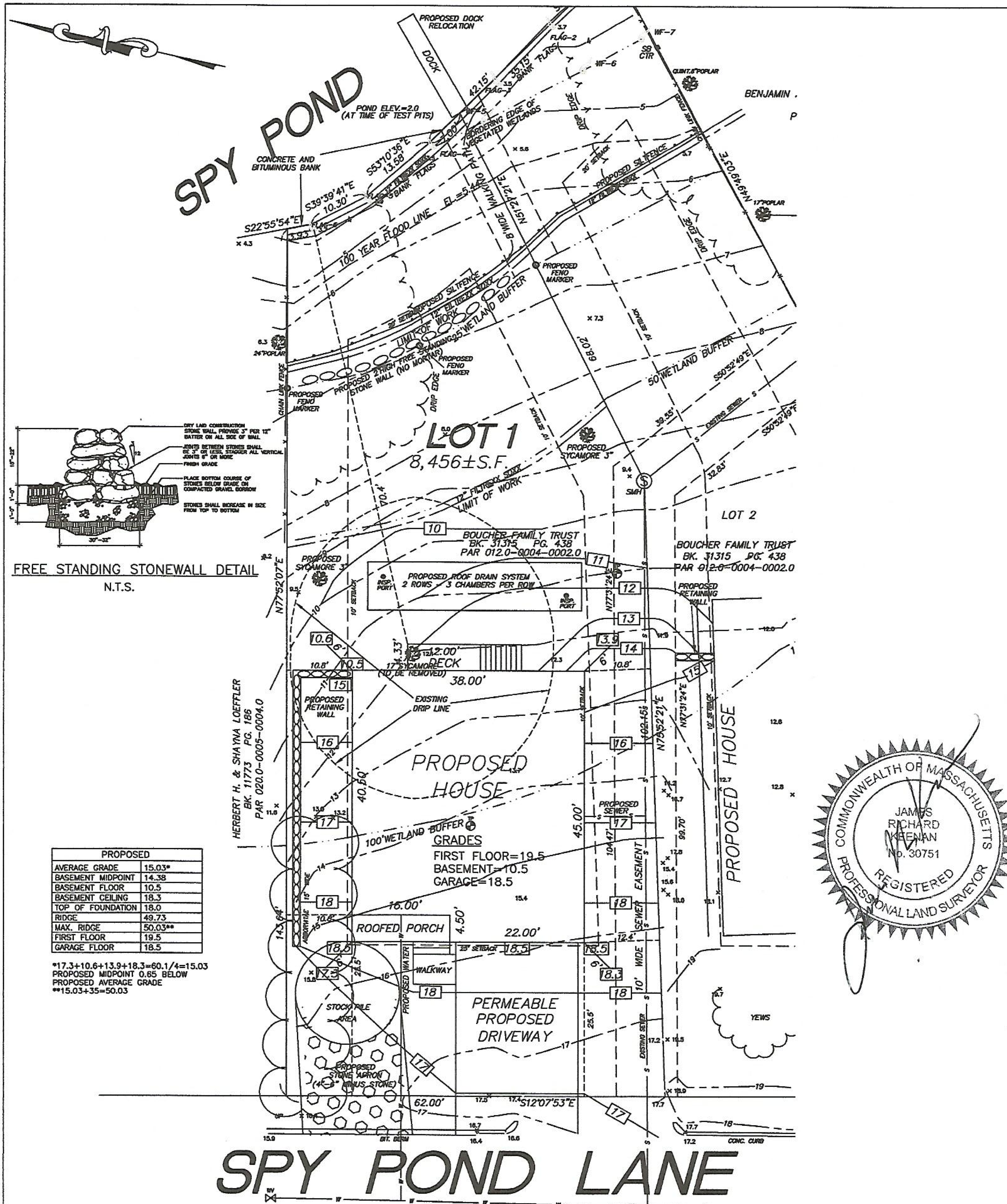
Retaining Wall

60. There shall be no retaining wall over the existing sewer easement. Instead, the property shall be gradually graded to meet the existing contours.

61. At least 21 days prior to construction, the Applicant shall submit a revised retaining wall plan to the Conservation Commission Agent for review and approval.

Dock

62. The dock on Lot 1/A must either be relocated to the property boundary between Lots 1/A and 2/B, or fully removed and abandoned before the Applicant named in this Order sells or conveys either Lot 1/A or Lot 2/B whichever occurs first.



PROPOSED	
AVERAGE GRADE	15.03*
BASEMENT MIDPOINT	14.38
BASEMENT FLOOR	10.5
BASEMENT CEILING	18.3
TOP OF FOUNDATION	18.0
RIDGE	49.73
MAX. RIDGE	50.03**
FIRST FLOOR	19.5
GARAGE FLOOR	18.5

*17.3+10.6+13.9+18.3=60.1/4=15.03
PROPOSED MIDPOINT 0.65 BELOW
PROPOSED AVERAGE GRADE
**15.03+35=50.03

I CERTIFY THAT THE BUILDINGS ARE LOCATED AS SHOWN AND THAT THIS PLOT PLAN IS THE RESULT OF AN INSTRUMENT SURVEY.

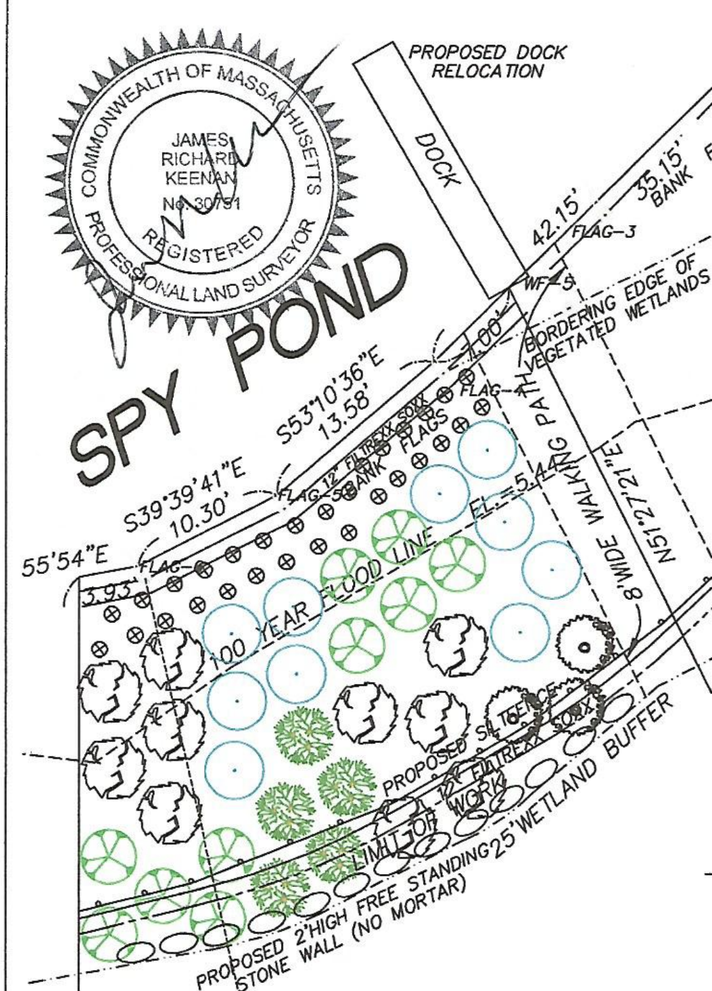
REVISED: DECEMBER 10, 2019
REVISED: OCTOBER 25, 2019
REVISED: JUNE 27, 2019
REVISED: JUNE 11, 2019

PROPOSED SITE PLAN
IN
ARLINGTON, MASS.

SCALE: 1 IN. = 10 FT. NOVEMBER 7, 2018

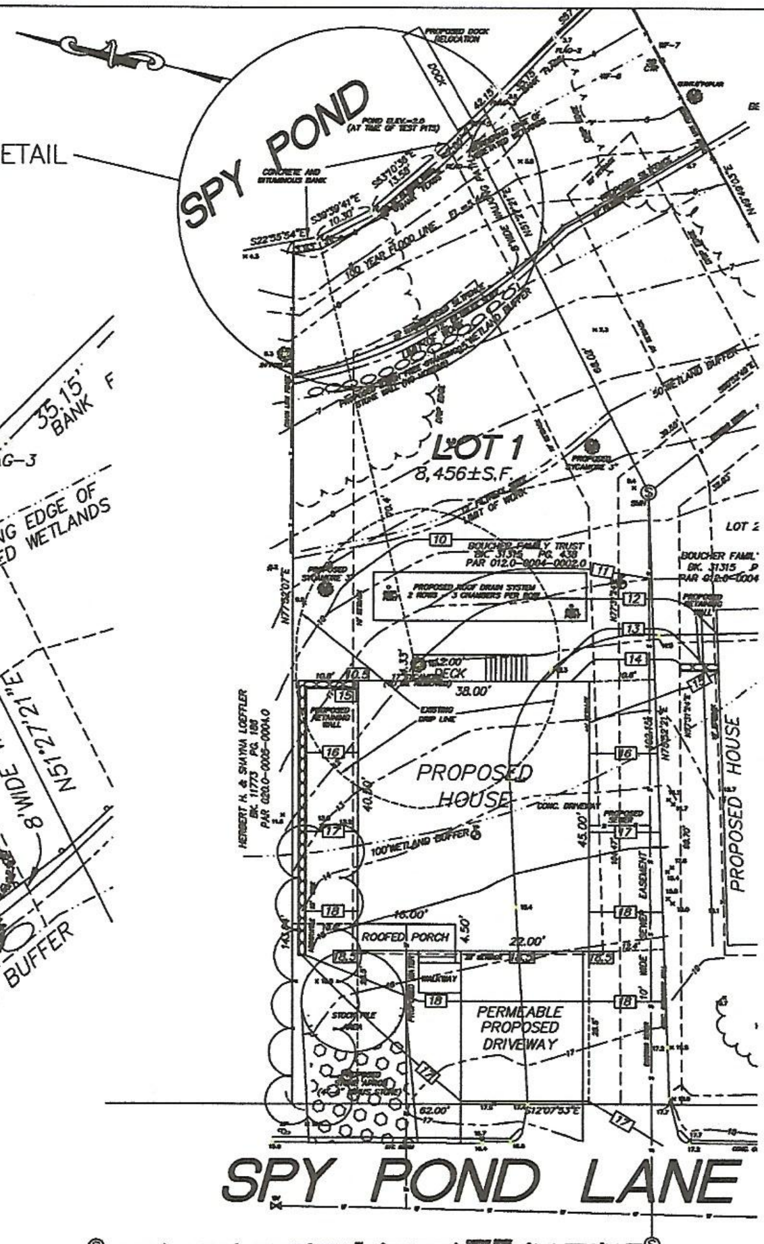
KEENAN SURVEY
8 WINCHESTER PLACE, SUITE 208
WINCHESTER, MASS. 01890
781-729-4213

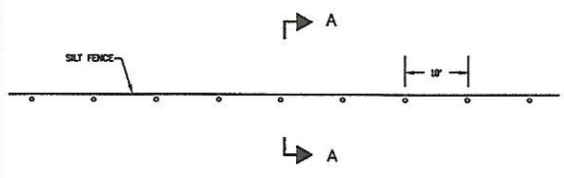
NO.	SYMBOL	SPECIES	HEIGHT	SIZE
(10)		= SWEET PEPPERBUSH (CLETHRA ALNIFOLIA)	3'–4' HIGH	#5C
(10)		= ARROWWOOD (VIBURNUM RECOGNITUM)	3'–4' HIGH	#5C
(10)		= SILKY DOGWOOD (CORNUS AMOMUM)	3'–4' HIGH	#5C
(5)		= WITCH HAZEL (HAMAMELIS VIRGINIANA)	6'–8' HIGH	#5C
(3)		= SHADBUSH (AMELANCHIER CANADENSE)	4'–6' HIGH	#5C
(30)		= LOWBUSH BLUEBERRY (VACCINIUM ANGUSTIFOLIA)	12" HIGH	#4C
(2)		= SYCAMORE (PLANTANUS OCCIDENTALIS)	2.5" CALIPER	BB (20" BALL MIN.)



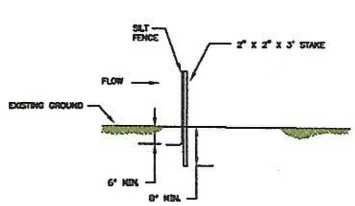
DETAIL

1"=4'



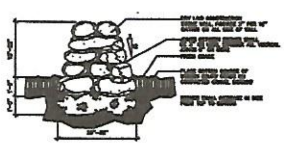


PLAN VIEW



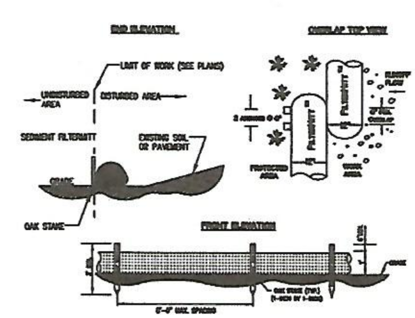
SECTION A–A

SILT FENCE PLAN



FREE STANDING STONEWALL DETAIL

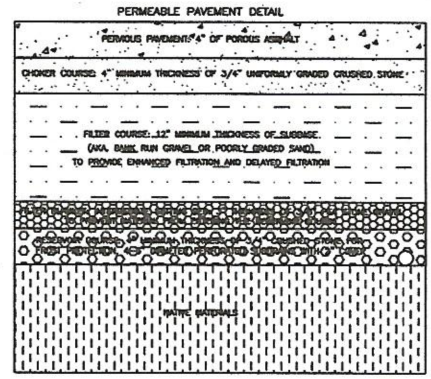
N.T.S.



EROSION CONTROL DETAIL

N.T.S.

PERMEABLE PAVEMENT DETAIL



I CERTIFY THAT THE BUILDINGS ARE LOCATED AS SHOWN AND THAT THIS PLOT PLAN IS THE RESULT OF AN INSTRUMENT SURVEY.

PROPOSED BASEMENT FLOOR=10.5
PROPOSED FIRST FLOOR=19.5
EXISTING AVERAGE GRADE TOP CURB=16.9
PROPOSED ROOF HEIGHT = 33.1'
PROPOSED PEAK = 50.0
MAX. PEAK = 51.9
PROPOSED GARAGE FLR.=18.5
EXISTING BUILDING COVER= 0%
PROPOSED BUILDING COVER= 21.3%
EXISTING IMPERVIOUS = 1775 S.F.
PROPOSED IMPERVIOUS = 1757 S.F.
EXISTING IMPERVIOUS (100'BUFFER)= 491 S.F.
PROPOSED IMPERVIOUS (100'BUFFER)= 879 S.F.
AREA WITHIN 25'BUFFER ZONE=1058S.F.

NOTES:

1) WATER SERVICE TO BE 1" TYPE "K" COPPER.
2) SEWER SERVICE TO BE 6" PVC.
3) WATER AND SEWER LATERALS SHALL BE 10' APART (min).
4) PROPOSED WATER TO BE CONNECTED TO NEW SERVICES.
5) PROPOSED SEWER TO BE CONNECTED TO NEW SERVICES.
6) LOT LOCATED IN FLOOD ZONE C. MAP 25017C0419E.
7) LAWN GRASS TO BE REMOVED FROM THE 0 TO 25 FOOT BUFFER ZONE AND THE AREA TOP DRESSED WITH A COMPOSTED LEAF LITTER MATERIAL, APPLIED TO A DEPTH OF 3–4 INCHES ACROSS THE RESTORATION AREA.

REVISED: OCTOBER 25, 2019
REVISED: JUNE 27, 2019
REVISED: JUNE 11, 2019

PLANTING PLAN
IN
ARLINGTON, MASS.

SCALE: 1 IN. = 10 FT. NOVEMBER 7, 2018

KEENAN SURVEY
8 WINCHESTER PLACE, SUITE 208
WINCHESTER, MASS. 01890
781–729–4213

Town of Arlington, Massachusetts

Notice of Intent

Summary:

Deliberation: Notice of Intent: Arlington Reservoir Master Plan Phase 2, 210 Lowell Street Continued Hearing

MassDEP File #091-0327

7:55pm	This project consists of the second phase of implementation of the Arlington Reservoir Master Plan and includes the following activities: parking area and stormwater improvements; improvements to existing pathways to make them accessible under the Americans with Disabilities Act (ADA); renovation and addition of new recreational facilities; shoreline bank stabilization; and upland habitat restoration and invasive species removal. Proposed project work is within the 100-ft Wetlands Buffer and Inland Bank area of the Arlington Reservoir. This project was presented to the Commission at its 12/17/2020 and 01/07/2021 meetings.

ATTACHMENTS:

Type	File Name	Description
Notice of Intent	Arlington_Reservoir_Phase_2_NOI_12032020.pdf	Res Phase 2 NOI
Notice of Intent	Arlington_Reservoir_Phase_2_NOI_Plans_12032020.pdf	Res Phase 2 NOI Plans
Notice of Intent	Arlington_Reservoir_Phase_2_Stormwater_Report_12032020.pdf	Res Phase 2 Stormwater Report
Notice of Intent	Arlington_Reservoir_Phase_2_Supplemental_KZLA_Memo_12302020.pdf	Res Phase 2 Supplemental KZLA Memo
Notice of Intent	Arlington_Reservoir_Phase_2_Supplemental_SWCA_Memo_12312020.pdf	Res Phase 2 Supplemental SWCA Memo
Notice of Intent	Arlington_Reservoir_Phase_2_Tree_Planting_Plans_Revised.pdf	Res Phase 2 Revised Tree Planting Plan
Notice of Intent	Arlington_Reservoir_Phase_2_Parking_Lot_Plans_Revised.pdf	Res Phase 2 Revised Parking Lot Plan
Notice of Intent	Arlington_Reservoir_Phase_2_Stormwater_Report_Revised.pdf	Res Phase 2 Revised Stormwater Report

Notice of Intent:

Arlington Reservoir Renovation Project – Phase 2

Arlington/Lexington, Massachusetts

December 2020

PREPARED FOR

Arlington Parks & Recreation Commission
Arlington, Massachusetts

PREPARED BY

SWCA Environmental Consultants
Kyle Zick Landscape Architecture, Inc.

SWCA Project No.: 60780

SWCA ENVIRONMENTAL CONSULTANTS
Sound Science. Creative Solutions.

Amherst Office
15 Research Drive
Amherst, Massachusetts 01002
Tel 413.256.0202 Fax 413.256.1092

December 3, 2020

Arlington Conservation Commission
730 Mass Ave. Annex
Arlington, MA 02476

Re: Arlington Reservoir Project
Notice of Intent
Arlington & Lexington, MA

Dear Members of the Conservation Commission:

On behalf of the Town of Arlington ("Applicant"), SWCA Environmental Consultants ("SWCA") and Kyle Zick Landscape Architecture (KZLA) have prepared this Notice of Intent ("NOI") application for work within regulated resource areas and buffer zone associated with the Bathing Beach Improvements to the Arlington Reservoir in Arlington and Lexington, Massachusetts. This NOI is being submitted pursuant to the Massachusetts Wetlands Protection Act ("WPA") (M.G.L. Ch. 31 s. 40) and its implementing regulations at 310 CMR 10.00, the Arlington Wetlands Protection Bylaw ("Arlington Bylaw") and the Lexington Wetlands Protection Bylaw ("Lexington Bylaw"). The Project consists of improvements to the reservoir's existing walking path, bank stabilization, and upland habitat restoration to manage invasive species.

The Project will require work on Inland Bank, and the 100-foot buffer zone to Inland Bank, as regulated under the WPA and the Bylaws. Work being proposed in the buffer zone is within a previously developed, recreational area and is intended to improve recreational access to the public. Some work along the pond bank will require minimal encroachment into the pond for the purposes of bank stabilization and establishment of native plants; however, the encroachment will consist of biodegradable stacked coir logs and native plants to establish an aquatic shelf to help stabilize the bank. The area along the bank above the created aquatic shelf will be regraded and restored with native plantings (please refer to the attached Design Development Set prepared by SWCA for details). The project team has met with members of both the Arlington and Lexington Conservation Commissions on-site and discussed the proposed work and have concurred that the proposal is the least impacting alternative to achieve the goals of: improved public access, bank stabilization, and upland restoration. Although many of the proposed activities meet the Limited Project provisions at 310 CMR 10.53(3) and (4), the Project has been designed to meet the performance standards for all wetland resource areas to the maximum extent practicable.

Notification has been made on this date to abutters. A copy of the abutter notification form is provided in Appendix A. As a municipal project, the work is exempt from State and Local filing fees.

SWCA respectfully requests that the Arlington Conservation Commission finds the Project adequately protective of the interests of the WPA and Bylaw and issue an Order of Conditions allowing the Project to proceed as described in this NOI. We look forward to presenting this Project to the Conservation Commission.

An NOI is being submitted separately to the Lexington Conservation Commission in mid-December. Since work at the Res spans the Towns of Arlington and Lexington, we request that the Conservation Commissions coordinate language in the Orders of Conditions so that the site contractors may work with one set of Conditions. If you have any questions regarding this application or would like to set up a site walk, please do not hesitate to contact me at 413-531-7156.

Sincerely,

Mickey Marcus, PWS

cc. MassDEP, Northeast Regional Office
Town of Arlington Parks and Recreation Commission
Kyle Zick Landscape Architecture
Woodard & Curran Engineering

WPA FORM 3

Arlington

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Arlington
City/Town

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

tab

return

Note: Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

A. General Information

1. Project Location (**Note:** electronic filers will click on button to locate project site):

210 Lowell Street a. Street Address	Arlington b. City/Town	02476 c. Zip Code
Latitude and Longitude:	42.42833°N d. Latitude	71.18659°W e. Longitude
Map 61 Block 1 f. Assessors Map/Plat Number	Lot 4 g. Parcel /Lot Number	

2. Applicant:

Joseph a. First Name		Connelly b. Last Name	
Town of Arlington Parks & Recreation Commission c. Organization			
422 Summer Street d. Street Address			
Arlington e. City/Town		Massachusetts f. State	02476 g. Zip Code
781-316-3880 h. Phone Number	i. Fax Number	jconnelly@town.arlington.ma.us j. Email Address	

3. Property owner (required if different from applicant): ☐ Check if more than one owner

a. First Name		b. Last Name	
c. Organization			
d. Street Address			
e. City/Town		f. State	g. Zip Code
h. Phone Number	i. Fax Number	j. Email address	

4. Representative (if any):

Mickey a. First Name		Marcus b. Last Name	
SWCA Environmental Inc c. Company			
15 Research Drive d. Street Address			
Amherst e. City/Town		MA f. State	01002 g. Zip Code
413-531-7156 h. Phone Number	i. Fax Number	mmarcus@swca.com j. Email address	

5. Total WPA Fee Paid (from NOI Wetland Fee Transmittal Form):

N/A a. Total Fee Paid	N/A b. State Fee Paid	N/A c. City/Town Fee Paid

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 3 – Notice of Intent
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

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Arlington
City/Town

A. General Information (continued)

6. General Project Description:

The Arlington Parks and Recreation Commission proposes the Arlington Reservoir Renovation Project Phase II, which includes parking area improvements, installation of new ADA-accessible pathways, new recreational facilities, a boat launch, bathing beach improvements, bank stabilization measures, and invasive species control/upland habitat restoration.

7a. Project Type Checklist: (Limited Project Types see Section A. 7b.)

1. ☐ Single Family Home
2. ☐ Residential Subdivision
3. ☐ Commercial/Industrial
4. ☐ Dock/Pier
5. ☐ Utilities
6. ☐ Coastal engineering Structure
7. ☐ Agriculture (e.g., cranberries, forestry)
8. ☐ Transportation
9. ☒ Other

7b. Is any portion of the proposed activity eligible to be treated as a limited project (including Ecological Restoration Limited Project) subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. ☒ Yes ☐ No If yes, describe which limited project applies to this project. (See 310 CMR 10.24 and 10.53 for a complete list and description of limited project types)

Beach improvements [10.53(3)(h)], water dependent uses [10.53(3)(l)], ecological restoration project [10.53(4)]

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR10.24(8), 310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Limited Project Checklist and Signed Certification.

8. Property recorded at the Registry of Deeds for:

Middlesex County	N/A
a. County	b. Certificate # (if registered land)
01	01
c. Book	d. Page Number

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

1. ☐ Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
2. ☒ Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 3 – Notice of Intent
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

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Arlington
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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☒ Bank	2,000 (approximately) 1. linear feet	2,000 (approximately) 2. linear feet
b. ☐ Bordering Vegetated Wetland	0 1. square feet	0 2. square feet
c. ☐ Land Under Waterbodies and Waterways	1. square feet 0 3. cubic yards dredged	2. square feet

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
d. ☐ Bordering Land Subject to Flooding	1. square feet 3. cubic feet of flood storage lost	2. square feet 4. cubic feet replaced
e. ☐ Isolated Land Subject to Flooding	1. square feet 2. cubic feet of flood storage lost	3. cubic feet replaced

f. ☒ Riverfront Area — Mill Brook (inland)
1. Name of Waterway (if available) **- specify coastal or inland**

2. Width of Riverfront Area (check one):

☐ 25 ft. - Designated Densely Developed Areas only

☐ 100 ft. - New agricultural projects only

☒ 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project: 30,000 square feet

4. Proposed alteration of the Riverfront Area:

a. total square feet	b. square feet within 100 ft.	c. square feet between 100 ft. and 200 ft.
		0

5. Has an alternatives analysis been done and is it attached to this NOI? ☐ Yes ☒ No

6. Was the lot where the activity is proposed created prior to August 1, 1996? ☒ Yes ☐ No

3. ☐ Coastal Resource Areas: (See 310 CMR 10.25-10.35)

Note: for coastal riverfront areas, please complete **Section B.2.f.** above.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 3 – Notice of Intent
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Arlington
City/Town

B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below	
b. ☐ Land Under the Ocean	1. square feet 2. cubic yards dredged	
c. ☐ Barrier Beach	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. ☐ Coastal Beaches	1. square feet	2. cubic yards beach nourishment
e. ☐ Coastal Dunes	1. square feet	2. cubic yards dune nourishment

	Size of Proposed Alteration	Proposed Replacement (if any)
f. ☐ Coastal Banks	1. linear feet	
g. ☐ Rocky Intertidal Shores	1. square feet	
h. ☐ Salt Marshes	1. square feet	2. sq ft restoration, rehab., creation
i. ☐ Land Under Salt Ponds	1. square feet 2. cubic yards dredged	
j. ☐ Land Containing Shellfish	1. square feet	
k. ☐ Fish Runs	Indicate size under Coastal Banks, inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above 1. cubic yards dredged	
l. ☐ Land Subject to Coastal Storm Flowage	1. square feet	

4. ☐ Restoration/Enhancement
If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please enter the additional amount here.

a. square feet of BVW

b. square feet of Salt Marsh

5. ☐ Project Involves Stream Crossings

a. number of new stream crossings

b. number of replacement stream crossings

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 3 – Notice of Intent
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Arlington
City/Town

C. Other Applicable Standards and Requirements

☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section C and complete Appendix A: Ecological Restoration Limited Project Checklists – Required Actions (310 CMR 10.11).

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to http://maps.massgis.state.ma.us/PRI_EST_HAB/viewer.htm.

a. ☐ Yes ☒ No

If yes, include proof of mailing or hand delivery of NOI to:

Natural Heritage and Endangered Species Program
Division of Fisheries and Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

2017
b. Date of map

If *yes*, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); *OR* complete Section C.2.f, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

c. Submit Supplemental Information for Endangered Species Review*

1. ☐ Percentage/acreage of property to be altered:

(a) within wetland Resource Area ____________ percentage/acreage

(b) outside Resource Area ____________ percentage/acreage

2. ☐ Assessor's Map or right-of-way plan of site

2. ☐ Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work **

(a) ☐ Project description (including description of impacts outside of wetland resource area & buffer zone)

(b) ☐ Photographs representative of the site

* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/). Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

** MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.

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C. Other Applicable Standards and Requirements (cont'd)

(c) ☐ MESA filing fee (fee information available at http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/mesa/mesa_fee_schedule.htm). Make check payable to "Commonwealth of Massachusetts - NHESP" and ***mail to NHESP*** at above address

*Projects altering **10 or more acres** of land, also submit:*

(d) ☐ Vegetation cover type map of site

(e) ☐ Project plans showing Priority & Estimated Habitat boundaries

(f) OR Check One of the Following

1. ☐ Project is exempt from MESA review.
Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, http://www.mass.gov/dfwele/dfw/nhesp/regulatory_review/mesa/mesa_exemptions.htm; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

2. ☐ Separate MESA review ongoing. ______ a. NHESP Tracking # ______ b. Date submitted to NHESP

3. ☐ Separate MESA review completed.
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

3. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?

a. ☒ Not applicable – project is in inland resource area only b. ☐ Yes ☐ No

If yes, include proof of mailing, hand delivery, or electronic delivery of NOI to either:

South Shore - Cohasset to Rhode Island border, and the Cape & Islands:

Division of Marine Fisheries -
Southeast Marine Fisheries Station
Attn: Environmental Reviewer
836 South Rodney French Blvd.
New Bedford, MA 02744
Email: DMF.EnvReview-South@state.ma.us

North Shore - Hull to New Hampshire border:

Division of Marine Fisheries -
North Shore Office
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930
Email: DMF.EnvReview-North@state.ma.us

Also if yes, the project may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional Office.

Massachusetts Department of Environmental Protection
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C. Other Applicable Standards and Requirements (cont'd)

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

4. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

   a. ☐ Yes ☒ No If yes, provide name of ACEC (see instructions to WPA Form 3 or MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.

   b. ACEC

5. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?

   a. ☐ Yes ☒ No

6. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L. c. 130, § 105)?

   a. ☐ Yes ☒ No

7. Is this project subject to provisions of the MassDEP Stormwater Management Standards?

   a. ☒ Yes. Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:

      1. ☐ Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)

      2. ☒ A portion of the site constitutes redevelopment

      3. ☐ Proprietary BMPs are included in the Stormwater Management System.

   b. ☐ No. Check why the project is exempt:

      1. ☐ Single-family house

      2. ☐ Emergency road repair

      3. ☐ Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

      or

D. Additional Information

☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department.

1. ☒ USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)

2. ☒ Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.

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D. Additional Information (cont'd)

3. ☒ Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.

4. ☒ List the titles and dates for all plans and other materials submitted with this NOI.

Arlington Reservoir Phase 2
a. Plan Title

Kyle Zick Landscape Architecture, Inc
b. Prepared By

Kyle Zick, RLA
c. Signed and Stamped by

September 25, 2020
d. Final Revision Date

varies
e. Scale

Bank Restoration Plans, SWCA
f. Additional Plan or Document Title

September 29, 2020
g. Date

5. ☐ If there is more than one property owner, please attach a list of these property owners not listed on this form.

6. ☐ Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.

7. ☐ Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.

8. ☐ Attach NOI Wetland Fee Transmittal Form

9. ☒ Attach Stormwater Report, if needed.

E. Fees

1. ☒ Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

2. Municipal Check Number

3. Check date

4. State Check Number

5. Check date

6. Payor name on check: First Name

7. Payor name on check: Last Name

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F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

Joseph J Conn (signature) — 11/12/2020
1. Signature of Applicant — 2. Date

3. Signature of Property Owner (if different) — 4. Date

Mickey Marcus
Digitally signed by Mickey Marcus
DN: cn=Mickey Marcus, o=SWCA Environmental Consultants, ou, email=mmarcus@swca.com, c=US
Date: 2020.11.12 14:02:10 -05'00'
5. Signature of Representative (if any) — 6. Date

For Conservation Commission:
Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:
One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:
If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

NOTICE OF INTENT N
ARLINGTON RESERVOIR RENOVATION PROJECT–PHASE 2
ARLINGTON AND LEXINGTON, MASSACHUSETTS

Prepared for

Arlington Parks & Recreation Commission
422 Summer Street
Arlington, MA 02474
Attn: Joseph Connelly, Director

SWCA Environmental Consultants
15 Research Drive
Amherst, MA 01002
413-531-7156
www.swca.com

Kyle Zick Landscape Architecture, Inc.
36 Bromfield Street
Boston, MA 02108
617-451-1018
www.kylezick.com

SWCA Project No. 60780

December 2020

CONTENTS

Appendices

1 INTRODUCTION

SWCA Environmental Consultants (SWCA) in conjunction with Kyle Zick Landscape Architecture (KZLA) and Woodard & Curran Engineering (W&C) have prepared this Notice of Intent (NOI) on behalf of the Town of Arlington Parks & Recreation Commission for the proposed Arlington Reservoir Renovation Project – Phase 2 (Project). The Project consists of the second phase of implementation of the Arlington Reservoir Master Plan and includes the following activities:

- parking area and stormwater improvements
- improvements to existing pathways to make them accessible under the Americans with Disabilities Act (ADA)
- renovation and adding new recreational facilities, including renovations of the existing bathhouse and concessions building, lifeguard stands, picnic tables, a playground, a multi-use court, boat launch, check-in shelter, and several other site improvements.
- bank stabilization measures along the reservoir shore; and
- upland habitat restoration / invasive species removal.

This project work is a continuation of the Phase I Master Plan for the Res completed in 2018 by the Town of Arlington and Weston & Sampson engineers.

This joint NOI is submitted to the Arlington and Lexington Conservation Commissions pursuant to the Massachusetts Wetland Protection Act (WPA) MGL c.131 §40 and its Regulations, 310 CMR 10.00, the Arlington Wetlands Protection Bylaw (Arlington Bylaw) and the Lexington Wetlands Protection Bylaw (Lexington Bylaw) for activities within jurisdictional wetland resource areas and buffer zones. A copy of the NOI has also been provided to the Massachusetts Department of Environmental Protection (MassDEP).

We are providing both the Towns of Arlington and Lexington with a full set of the site plans. Separate NOI forms have been prepared for each of the Towns.

2 SITE DESCRIPTION

The Arlington Reservoir (Res) is in the Arlington Heights neighborhood with Lowell Street on the eastern side of the property. Although all the Res and its shoreline are owned by the Town of Arlington, approximately half of the area is located within the Town of Lexington. The total area of the Res is approximately 65 acres. The 28 acre reservoir was created in 1871 for use as a water supply by damming Munroe Brook. The Res is no longer used as a water supply source. The Res currently offers the community with recreational opportunities for swimming, fishing, walking, non-motorized boating, and other outdoor pursuits. During the summer months, the Town of Arlington operates a chlorinated and filtered swim area, separated from the main body of the pond by an Embankment. Facilities at the bathing beach are proposed to be updated, and several of these facilities are within the 100 foot buffer zone.

There is a gravel parking area off Lowell Street which is the primary site access. A dam with two outlets for flood mitigation is maintained and is in good condition having been rebuilt in 2006. A nearly one mile long walking path encircles the Res. There has been an active program to control invasive aquatic vegetation within the open water, and this NOI does not overlap with these activities, except to provide a reinforced boat ramp to permit weed harvesters better access to the water.

The pond banks are heavily eroded due to a combination of natural wind/water erosion, but also due to fishing and pond edge access for recreation.

Munroe Brook enters the Res on the northwest in the Town of Lexington, and the outlet is to the south in Arlington via a dam at the confluence with Sickle Brook to form Mill Brook.

2.1 Wetland Resources

The Arlington and Lexington Conservation Commission have previously reviewed project work and wetlands at the Res. The Arlington Conservation Commission issued Orders of Conditions for file 091-0304 for work at the bathing beach and a test plot of the walking path, and the Lexington Conservation Commission issued Orders for this same project work under DEP File: 201-1117 on January 7, 2019. This NOI is a continuation of the previous project work, but since there is additional work in wetland Resource Areas (primarily for bank restoration and beach renovation) a new NOI is appropriate rather than to amend the previous Orders of Conditions. We will request that the open Orders for both Towns should be closed.

Given the heavy use of the Res by residents, we did not place flagging tape to show the top of the bank. These areas were surveyed and are shown on the site plan. There is no BVW proposed to be altered as part of this project. We describe invasive species control within the uplands, and a significant amount of this work will be within the 100 foot buffer of the Res. The Town of Arlington has determined not to remove any trees, even those which may be non-native; the invasive species control/removal will be herbaceous vegetation and shrubs.

2.1.1 *Land Under Waterbodies and Waterways*

The entire Res (approximately 28 acres) is LUW. The Town of Arlington has retained Solitude Lake Services to help manage the invasive aquatic vegetation (preliminary water chestnut), and this NOI does not propose work within LUW. The bank stabilization and restoration work proposed is within the Bank wetland resource area.

No work is proposed within any of the perennial or intermittent streams on the Res. Work for the walking path reconstruction and bank stabilization will be within the 200 foot Riverfront Area of Munroe Brook, but there is no new clearing or permanent alteration of habitat.

2.1.2 *Inland Bank*

Embankment. A stone berm separates the bathing beach from the main body of the Res and is located both in Arlington and Lexington (see site plans L1.1 and L1.2).The total area is approximately 12,520 square feet and is jurisdictional bank (10.54). This area is currently overgrown and vegetated with trees and shrubs and provides both an informal walking path as well as wildlife habitat. Although it is "bank", it is not deemed to provide important wildlife habitat (10.54 (4)(a)(5) due to the stone construction. It is proposed to clear this area of invasive vegetation (multiflora rose, autumn olive, bittersweet, purple loosestrife). Poison ivy on the embankment is also proposed to be removed. Work on the embankment is to provide better public access, including ADA compliant use. The trees are not proposed to be cut.

Pond Bank. Most of the banks of the Res are steep and eroded. This NOI proposes to repair all the eroded banks over time (see bank restoration figure). We have surveyed the edge of the Res and have shown a color-coded map of the erosion observed during the summer of 2020. The areas shown in red (Treatment A) shows heavily eroded areas with more than 12 inch high banks, with a vertical profile. The areas shown in Orange (Treatment B) are moderately eroded vertically banks less than 12 inches high.

The Yellow areas (Treatment C) are stable banks with little or no erosion, and no recommendations for stabilization, except for restoring vegetation along the bank and adjacent slopes. The Green areas (Treatment D) are stable banks with good vegetation cover, and no action or treatments are proposed, except for the removal of invasive species. We are recommending that four separate Treatment A areas should be the first phase of bank restoration. These are locations are shown on sheet 2 of the restoration site plans and include: 305 feet adjacent to the parking lot and boat launch; 270 feet along the outlet structure (used for fishing); 145 feet along an area of an eroded piped inlet; and 125 linear feet adjacent to the Munroe Brook inlet. These four eroded and unstable areas are the highest priority for the first phase of bank stabilization.

The proposed bank stabilization exceeds the 50 foot wildlife habitat threshold; however, the bank restoration may be permitted by the Conservation Commissions as the proposed work will not have an adverse effect on wildlife habitat in accordance with the procedures contained in 10.60. We are proposing all biodegradable materials and native plantings to reduce erosion, and enhance wildlife habitat features along the shoreline of the Res.

The proposed work extends from the lower boundary of Bank to the upper boundary of Bank. The lower boundary fluctuates based on the reservoir level but is typically 156.8 feet.

2.1.3 *Bordering Land Subject to Flooding*

The water level within the Res is controlled by the dam and two outlet control structures. No alteration of BLSF is proposed.

2.1.4 *Buffer Zone/Erosion Control*

Almost the entire Res property is within the 100 buffer zone to the banks of the Res, or inlet/outlet streams. There is significant new work proposed within the buffer zone, and sediment and erosion controls are proposed adjacent to all new work activities, include the bank restoration work.

Compost filled filter socks are proposed to be used in the upland areas adjacent to all site work to protect the Res from sedimentation. For the bank restoration we are proposing the use of a turbidity curtain to be placed between the edge of the work at the open water to protect the Res from site work and erosion during construction. Silt sacks will be installed in existing catch basins draining to the Res, and tree protection fencing will be used to separate and protect existing trees during construction activities. Site Plan LD1.1 shows the details of the proposed erosion controls.

2.2 Other Sensitive Resources

SWCA reviewed the Massachusetts Geographic Information System (MassGIS) to determine if the proposed project is within or near other sensitive environmental areas. These areas included protected rare species, important watersheds, and other special environmental characteristics. There are no known sensitive resources within the work area.

2.2.1 *Natural Heritage and Endangered Species Review Program (NHESP)*

SWCA reviewed the MassGIS database to determine if the project is located within or adjacent to areas designated as NHESP Priority Habitats of Rare Species, Estimated Habitats of Rare Wildlife, certified vernal pools (CVP), or potential vernal pools (PVP). No Priority Habitats, Estimated Habitats, CVPs or

PVPs are mapped by MassGIS in the area. No potentially certifiable vernal pools were noted during field investigations.

2.2.2 Outstanding Resource Waters and Areas of Critical Environmental Concern

SWCA reviewed the MassGIS database to determine if the site is located within Outstanding Resource Waters (ORWs) or Areas of Critical Environmental Concern (ACECs). ORWs are watershed areas that have been classified as such under the Massachusetts Surface Water Quality Standards and are areas that contain surface waters and their tributaries, including certain wetlands, that have been designated for protection based on their outstanding socio-economic, recreational, ecological and/or aesthetic values. These waters have been identified so that the quality of the waters may be protected and maintained. ACECs are areas designated in Massachusetts that receive special recognition because of the quality, uniqueness, and significance of its natural and/or and cultural resources. There are no ORWs or ACECs located within or adjacent to the proposed project area.

3 PROPOSED WORK

The goal of this project work by the Tow of Arlington is to improve the recreational opportunities of the entire Res property, and to improve the ecological health of the pond. The Town of Arlington has recognized that the stormwater management of the Res should be improved, and the sediment and nutrient loading into the Res could be improved by improvements to the existing parking areas, and shoreline. The following is a summary of the proposed work as outlined in the site plans.

3.1 Project Description

The Project consists of the second phase of implementation of the Arlington Reservoir Master Plan and includes the following activities:

- parking area improvements
- Stormwater upgrades
- improvements to existing pathways to make them accessible under the Americans with Disabilities Act (ADA)
- renovated or new recreational facilities, including renovations of the existing bathhouse and concessions building, lifeguard stands, picnic tables, a playground, a multi-use court, boat launch, check-in shelter, and several other surficial site improvements
- bank stabilization measures along the reservoir shore; and
- upland habitat restoration / invasive species removal.

Depending on permitting, and bidding, the construction activities are expected to begin in March 2021 and to be completed in November 2021. The Town anticipates that the bank restoration work will be completed as funding allows, starting with the most eroded locations as shown on the restoration site plans. Each of these activities are further described below.

3.1.1 *Parking Area Improvements*

The existing gravel parking area will be replaced with permeable concrete pavers, porous pavement, and concrete pavement. Accessible parking will be incorporated into the parking lot, and a concrete boat launch area will be established for non-motorized boats, and to ensure entry to the open water for the weed harvester used for aquatic species removal and control. Benches, a canoe storage rack, and revegetation plan are proposed within the redeveloped parking lot. Site plan L2.2 shows the details of the parking area.

The Arlington Parks & Recreation Commission proposes to install porous pavement over the approximately 0.5-acre gravel parking area in the southern portion of the site.

3.1.2 *Stormwater Management*

A stormwater management report in compliance with DEP stormwater regulations was prepared by Woodard & Curran and dated October 2020. The proposed design uses Low Impact Development designs as recommended in the Phase I Master Plan (2018) and with current DEP stormwater management recommendations. The project work will use porous pavement materials to replace a 0.5 acre gravel parking lot. The proposed stormwater measures also include the renovation of the existing bathhouse ad concessions building, the installation of new ADA accessible concrete pathways, the playground, boat launch, an athletic court, and several other surficial site improvements. The proposed work is a redevelopment project as there are no new development areas, only improvements of existing developed areas, and the improvement of stormwater management and water quality to the Res.

In accordance with the MA stormwater regulations, storm events from 1 year (2.67 inches) to the 100 year storm event (8.85 inches) were evaluated. The parking lot restoration includes a 21,500 square foot area of porous pavement, and the multi-purpose athletic court is also designed with permeable materials to maximize infiltration. In addition to the multi-layers of stone and gravel, the design has built in sufficient storage capacity to retain the 100 year storm event. Beyond this storm event, the drainage will discharge via three outlets to the Res.

The goal of the stormwater management is to improve the existing site conditions by infiltrating stormwater rather than having a direct overland flow into the Res. We anticipate immediate improvements to water quality in the Res by reducing the nutrient load and reducing the total suspended solids currently in the stormwater runoff.

The stormwater calculations (see page 9 of the stormwater report) shows a net decrease in the post development rate of runoff from the 1 year to the 100 year storm event, and full compliance with the DEP stormwater management standards. A copy of the DEP stormwater checklist is included at the end of the stormwater management report.

3.1.3 *Walking Path Improvements*

The existing walking path is composed of gravel and un-improved packed dirt and un-even surfaces. It is proposed to replace the existing trail with an 8 foot wide to 12 foot wide crushed granite path, with an alternate design using a rubber surfaced trail. The rebuilt trail will be installed around the circumference of the Res to replace the existing trail with a uniform and ADA compliant surface. The surface will be underlain by a crushed stone base. Plan Sheet LD1.2 provides the details of the walking path.

Additional paths which join other walkways will be re-built and made ADA compliant. All walking paths are within the 100 foot buffer zone to the Bank, and sediment and erosion controls are proposed (compost sock) adjacent to all work areas until the construction is completed and the site stabilized.

3.1.4 *Other Recreational Structures*

The proposed work will rebuild the bathing beach & recreational facilities to include a new playground, ADA compliant access, refreshing bathing beach sand, concession buildings, athletic court, pump house, and bathhouse. The existing buildings will be fully renovated. Sheets L1.1 shows the northern end of these facilities, and L1.2 shows the southern end of the facilities. There are additional structures proposed around the Res and these include benches, trash and recycling receptacles, a large hexagonal bench, a picnic pavilion, boulders, signage, and other similar features.

Almost all work is within the 100 foot buffer zone to the banks of the Res, and sediment and erosion controls (compost sock) is proposed to be installed between all work areas and the open water, including on either side of the embankment. These locations are shown on the site plan LD1.2 and LD1.3.

A new boat launch is proposed for recreational non-motorized boats. It is proposed using an articulating concrete block ramp (see Plan detail on Sheet LD1.3) which will allow the launching of the weed harvester used to collect water chestnut, and for aquatic plant management pond access. A canoe rack is proposed to be installed near the boat launch.

3.1.5 *Bank Stabilization*

As described in an earlier section, the banks of the Res have significant areas of erosion due to normal processes from wind and water, but also due to heavy use by recreational uses who want access to the open water. Design plans to use biodegradable coir (coconut fiber) are to be used against the vertically eroded banks, with the soil backfilled behind the logs. Details are provided on the restoration site plans Sheet 4.0. For the eroded bank sections with less than 12 inches of vertical erosion one 12 inch coir log installed against the bank face is proposed. Where the vertical erosion is greater than 12 inches high, a stacked arrangement of three coir logs will be used. The coir will be held in place with duck bill earth anchors and wire. This anchoring method will not use protruding stakes which may be a hazard to young children clamoring over the bank. Coir is not permanent and has a normal life span of approximately 5 years. The coir does provide a stable bank which allows the installed native vegetation to become established and allows the roots to help permanently stabilize the shoreline.

The following table shows the total bank restoration proposed in the NOI. The Town of Arlington will conduct this work in phases, and funding permits.

Table 1. Bank Restoration

Area	Type of Erosion	Total linear feet	Estimated Restoration Planting (square feet)
Area A	High erosion >12”	2,120	31,800
Area B	Moderate erosion <12”	1,650	24,750
Area C	Stable. Planting only	130	1,950
Area D	Stable. Planting only	680	10,200
Embankment	Stable		Invasive removal only

Native trees, shrubs and emergent plant species are proposed to be used in conjunction with the bank stabilization work. The total buffer zone habitat revegetation enhancement is 68,700 square feet. Restoration Plan Sheet 5.0 includes a list of the proposed revegetation planting plan to be implemented. We anticipate that the restoration of the bank and adjacent habitat will be restored over time, as funding permits. The restoration plantings will follow the bank stabilization and the invasive species removal as described below. A native seed mix has been specified to restore disturbed soils in the buffer zone and shady areas adjacent to the Res.

3.1.6 *Upland Habitat Restoration/Invasive Species Removal*

Revegetation. Landscape plantings have been incorporated into the design plans by KZLA and these areas are shown on the site plan drawings. Sheet L4.4 incorporates the restoration using trees and shrubs to be used to revegetate the different shoreline restoration areas. Sheet L4.2A provides the plant list to be incorporated in the bathing beach and parking lot areas which includes trees, shrubs, and groundcover plantings. The revitalization of the landscape is an important aspect of this project, and the goal is to establish new shade trees, and to provide a native and attractive landscape planting to replace the older landscaping and plants in poor condition.

Invasive Species Management. The invasive plant species identified at the project site by SWCA and KZLA included the following species: multiflora rose (*Rosa multiflora*); common buckthorn (*Rhamnus cathartica*); autumn olive (*Elaeagus umbellate*); Oriental bittersweet (*Celatrus orbiculatus*); Japanese Barberry; burning bush; Black Swallowort; Japanees Knotweed and purple loosestrife (*Lythrum salicaria*). Poison ivy (*Toxicodendron radicans)*, although not a listed invasive species, was observed throughout the project site and will be managed due to its potential to cause harm to recreational users. Invasive trees such as Black Locust and Norway Maple are not proposed to be cut or managed. Invasive species management will be conducted to reduce or eradicate the invasive plant species identified within the project limits. Due to the varying levels of plant maturity and presence of both herbaceous and woody invasive species, various methods of management will be utilized to provide the most effective control.

Herbaceous species such as purple loosestrife and immature woody invasive species seedlings will be managed with a foliar herbicide application. Foliar treatments will be conducted by using a low-pressure backpack sprayer or handheld sprayer to apply an herbicide solution to the leaves of the target species. All

foliar management will be conducted as spot treatments where individual target plants are selected for treatment. Broadcast treatments are not proposed. Foliar applications require the use of a non-ionic surfactant to provide successful control. SWCA proposes the use of a non-ionic surfactant approved for use within wetland areas for this project. For all foliar applications, a 2% solution of Rodeo (glyphosate) or 2.56 ounces of herbicide per gallon of water will be applied with 1% or 1.33 ounces of the surfactant. Following successful control of herbaceous populations and other target plants, dead invasive species material will be removed and disposed of offsite.

Target invasive trees, shrubs, and vines encountered within the project limits will be managed with cut-stem herbicide treatments. Cut-stem treatments will involve the use of hand tools (chainsaws, pruners, loppers, etc.) to cut the stem or vine followed by a spray or wipe application of herbicide solution to the exposed stem surface. All cuts will be made within 6-inches of the ground and the cut material will be removed and disposed of offsite. Invasive vines such as Oriental bittersweet encountered climbing on trees will be cut and removed to the greatest extent feasible. Special care will be taken to avoid damages to the native canopy during removal. Following cutting, a 50% solution of Rodeo or 64 ounces of herbicide per gallon of water will be applied to the freshly cut surface. The herbicide solution will be applied using a handheld sprayer or a brush/swab.

All invasive species management will be conducted during the summer months while the target plants are actively growing. Treatments should be conducted between July and August of each year and should be separated by at-least two weeks. Approximately two herbicide treatments should be scheduled per season for at-least two years following initiation of project work. As regulated by the label for the products, the applicator will not apply more than 8 quarts of Rodeo per acre, per year at the project site. A marking dye will be used to help the applicators identify the treated plant materials as they are working and to minimize overspray onto non-target species during the herbicide applications.

We anticipate that the control of invasive species at the Res will be a long-term endeavor and will require multiple years to bring the invasive species population under control. We will therefore request that the Arlington and Lexington Conservation Commission along the control of upland invasive species to be part of the O&M plan and to be a non-expiring Condition. We anticipate that year end reports by the Certified Applicator will be provided to the Conservation Commissions.

3.2 Project Impacts

There are short term impacts to Inland Bank during restoration, but no long-term alteration or filling. The proposed work is ecological restoration of a degraded wetland Resource Area. We anticipate the bank restoration work will be a long-term project to be completed over multiple years and will require continuing Conditions to allow the long-term maintenance of the restored bank and vegetation.

The total area of high and moderate bank erosion is 3,770 linear feet.

3.3 Mitigation Measures

In addition to the restoration of the Bank. We estimate the restoration of the upland buffer zone to be approximately 68,700 square feet. The restoration work is anticipated to be a long-term project at the Res and will be conducted over multiple years. We will request the Conservation Commissions to issue a non-expiring Order to permit the maintenance of the buffer zone vegetation that will include revegetation and the removal of invasive species.

4 REGULATORY REVIEW

The proximity of jurisdictional resources to the project work area at the Res falls under the regulation of the WPA and its implementing regulations, the Town of Arlington Wetlands Protection Bylaw, and the Town of Lexington Wetlands Protection Bylaw. We request coordination by both Towns to issue Orders of Conditions which contain the same language as the site contractors will be working in both Arlington and Lexington to implement the beach improvement project and restoration work.

5 SUMMARY

The proposed work plan is the implementation phase and follows the initial recommendations of Phase I of the Master Plan for the Res. There are significant site improvements proposed for the recreational use of the bathing beach and play areas. The gravel parking area is proposed to be rebuilt using permeable materials to infiltrate stormwater, and to improve the water quality of the Res. Reconstruction of the walking path around the Res, and numerous infrastructure features are proposed. The eroded bank segments along the shoreline are proposed to be restored and stabilized, and invasive species are proposed to be removed, and replaced with native species.

There are no wetland resource areas which will be lost. The work within resource areas is for restoration purposes and will result in improved stormwater management, improved wildlife habitat, and a decrease in nutrients and sediment entering the Res. This NOI does not include aquatic vegetation control within the Res. Work proposed is along the Bank and Buffer Zone.

We anticipate the major infrastructure project work at the Res will be completed within the next three years, but the ecological restoration work will likely be initiated over a longer time due to funding availability. For this reason, we request the Conservation Commissions to consider issuing a 5 year Order of Conditions to allow for continued bank and buffer zone restoration work. We are also requesting the Conservation Commissions to issue non-expiring Conditions for the maintenance of the restored infrastructure, stormwater management, bank restoration, and invasive species control.

APPENDIX A

Abutter Notification

Office of the Board of Assessors
Robbins Memorial Town Hall
Arlington, MA 02476
(781) 316-3050
Assessors@town.arlington.ma.us

Abutters List

Date: November 12, 2020

Subject Property Address: 0-LOT LOWELL ST Arlington, MA
Subject Property ID: 61-1-4

Search Distance: 100 Feet - Conservation

The Board of Assessors certifies the names and addresses of requested parties in interest, all abutters to a single parcel within 100 feet.

Please see enclosed map for any abutting property within 100 feet that is in another city or town.

Kevin C. Feeley
Robert E. Greeley

Board of Assessors

Printed on 11/10/2020 at 08:57 AM

Abutters List
Date: November 12, 2020
Subject Property Address: 0-LOT LOWELL ST Arlington, MA
Subject Property ID: 61-1-4
Search Distance: 100 Feet

Prop ID: 61-1-3
Prop Location: 0-LOT MASS AVE Arlington, MA
Owner: TOWN OF ARLINGTON PARK
Co-Owner:
Mailing Address:
730 MASS AVE
ARLINGTON, MA 02476

Prop ID: 61-1-4
Prop Location: 0-LOT MASS AVE Arlington, MA
Owner: TOWN OF ARLINGTON PARK
Co-Owner:
Mailing Address:
730 MASS AVE
ARLINGTON, MA 02476

Prop ID: 61-1-5
Prop Location: 202 LOWELL ST Arlington, MA
Owner: YOUNG DOUGLAS W & CATHRINE K
Co-Owner:
Mailing Address:
202 LOWELL STREET
ARLINGTON, MA 02474

Prop ID: 61-1-6
Prop Location: 198 LOWELL ST Arlington, MA
Owner: SCHWARTZ ELIZABETH
Co-Owner:
Mailing Address:
198 LOWELL ST
ARLINGTON, MA 02474

Prop ID: 61-1-7
Prop Location: 194 LOWELL ST Arlington, MA
Owner: BULL PETER
Co-Owner: DOIDGE THEA
Mailing Address:
194 LOWELL STREET
ARLINGTON, MA 02474

Prop ID: 61.A-10-1
Prop Location: 10 COLONIAL VILLAGE DR UNIT JI
Arlington, MA
Owner: VALLE ALISON Y
Co-Owner:
Mailing Address:
10 COLONIAL VILLAGE DR #1
ARLINGTON, MA 02474

Prop ID: 61.A-10-10
Prop Location: 10 COLONIAL VILLAGE DR UNIT J10
Arlington, MA
Owner: SULLIVAN ROSEMARY T
Co-Owner:
Mailing Address:
10 COLONIAL VILLAGE DR #10
ARLINGTON, MA 02474

Prop ID: 61.A-10-11
Prop Location: 10 COLONIAL VILLAGE DR UNIT J11
Arlington, MA
Owner: GILLIGAN BARBARA YEM- HANG/ TRS
Co-Owner: BARBARA YEM-HANG GILLIGAN
Mailing Address:
10 COLONIAL VILLAGE DR #11
ARLINGTON, MA 02474

Prop ID: 61.A-10-12
Prop Location: 10 COLONIAL VILLAGE DR UNIT J12
Arlington, MA
Owner: BRASIL DEASSIS MORAES GUSTAVO
Co-Owner: SOARES CRISTIANE
Mailing Address:
10 COLONIAL VILLAGE DR #12
ARLINGTON, MA 02474

Prop ID: 61.A-10-2
Prop Location: 10 COLONIAL VILLAGE DR UNIT J2
Arlington, MA
Owner: IORDANIDIS ATHINA
Co-Owner:
Mailing Address:
10 COLONIAL VILLAGE DR #2
ARLINGTON, MA 02474

Prop ID: 61.A-10-3
Prop Location: 10 COLONIAL VILLAGE DR UNIT J3
Arlington, MA
Owner: ROGERS BRUCE LEE
Co-Owner: LI JINYU
Mailing Address:
107 PINE ST
WOBURN, MA 01801-3373

Prop ID: 61.A-10-4
Prop Location: 10 COLONIAL VILLAGE DR UNIT J4
Arlington, MA
Owner: VAN RHEENEN CONNIE
Co-Owner:
Mailing Address:
38 BRADBURY STREET
CAMBRIDGE, MA 02138

Prop ID: 61.A-10-5
Prop Location: 10 COLONIAL VILLAGE DR UNIT J5
Arlington, MA
Owner: ABUGOV GREGORY & VICTORIA
Co-Owner:
Mailing Address:
16 ENDICOTT PL
CANTON, MA 02021

Prop ID: 61.A-10-6
Prop Location: 10 COLONIAL VILLAGE DR UNIT J6
Arlington, MA
Owner: PINE DANIEL R
Co-Owner:
Mailing Address:
51 STOWCROFT RD
ARLINGTON, MA 02474

Prop ID: 61.A-10-7
Prop Location: 10 COLONIAL VILLAGE DR UNIT J7
Arlington, MA
Owner: HAN XIAOGANG &
Co-Owner: DONG JENNIFER
Mailing Address:
508 LOWELL ST
LEXINGTON, MA 02420

Prop ID: 61.A-10-8
Prop Location: 10 COLONIAL VILLAGE DR UNIT J8
Arlington, MA
Owner: LIN ZHOUFANG
Co-Owner:
Mailing Address:
10 COLONIAL VILLAGE DR #8
ARLINGTON, MA 02474

Prop ID: 61.A-10-9
Prop Location: 10 COLONIAL VILLAGE DR UNIT J9
Arlington, MA
Owner: CHAN MARY KAR-MI
Co-Owner:
Mailing Address:
10 COLONIAL VILLAGE DR #9
ARLINGTON, MA 02474

Prop ID: 61.A-1-1
Prop Location: 1 COLONIAL VILLAGE DR UNIT A1
Arlington, MA
Owner: BAGWADIA ZUBIN ETAL TR
Co-Owner: HOPE CYRUS BAGWADIA
Mailing Address:
87 OAK RIDGE TER
LYNNFIELD, MA 01940

Prop ID: 61.A-1-10
Prop Location: 1 COLONIAL VILLAGE DR UNIT A10
Arlington, MA
Owner: ZHOU XIAOXIONG
Co-Owner: A/K/A ZHOU FLORA
Mailing Address:
1 COLONIAL VILLAGE DR #10
ARLINGTON, MA 02474

Prop ID: 61.A-1-11
Prop Location: 1 COLONIAL VILLAGE DR UNIT A11
Arlington, MA
Owner: BARRY ELLEN J
Co-Owner:
Mailing Address:
1 COLONIAL VILLAGE DR #11
ARLINGTON, MA 02474

Prop ID: 61.A-11-1
Prop Location: 11 COLONIAL VILLAGE DR UNIT K1
Arlington, MA
Owner: LOPEZ DAVID
Co-Owner: QUIROS LOURDES
Mailing Address:
146 OAKLAND ST
MALDEN, MA 02148

Prop ID: 61.A-11-10
Prop Location: 11 COLONIAL VILLAGE DR UNIT K10
Arlington, MA
Owner: LOPEZ DAVID F
Co-Owner:
Mailing Address:
146 OAKLAND ST
MALDEN, MA 02148

Prop ID: 61.A-11-11
Prop Location: 11 COLONIAL VILLAGE DR UNIT K11
Arlington, MA
Owner: HIGGINS JAMES F
Co-Owner:
Mailing Address:
4836 COMANCHE TRAIL
PRESCOTT, AZ 86301

Prop ID: 61.A-11-12
Prop Location: 11 COLONIAL VILLAGE DR UNIT K12
Arlington, MA
Owner: WALKER KATHRYN R
Co-Owner:
Mailing Address:
11 COLONIAL VILLAGE DR #12
ARLINGTON, MA 02474

Prop ID: 61.A-1-12
Prop Location: 1 COLONIAL VILLAGE DR UNIT A12
Arlington, MA
Owner: MA ZHOUYANG
Co-Owner:
Mailing Address:
1 COLONIAL VILLAGE DR #12
ARLINGTON, MA 02474

Prop ID: 61.A-11-2
Prop Location: 11 COLONIAL VILLAGE DR UNIT K2
Arlington, MA
Owner: TIERNEY LAURA J TRUSTEE
Co-Owner: PIANTES SOUTH MIDDLESEX COUNTY
Mailing Address:
216 RANGEWAY RD UNIT 142
NORTH BILLERICA, MA 01862

Prop ID: 61.A-11-3
Prop Location: 11 COLONIAL VILLAGE DR UNIT K3
Arlington, MA
Owner: DIMILLA JULIE ELIZABETH
Co-Owner:
Mailing Address:
11 COLONIAL VILLAGE DR #3
ARLINGTON, MA 02474

Prop ID: 61.A-11-4
Prop Location: 11 COLONIAL VILLAGE DR UNIT K4
Arlington, MA
Owner: TU WENHONG
Co-Owner:
Mailing Address:
26 SADDLE CLUB RD
LEXINGTON, MA 02420

Prop ID: 61.A-11-5
Prop Location: 11 COLONIAL VILLAGE DR UNIT K5
Arlington, MA
Owner: LOPEZ DAVID F
Co-Owner:
Mailing Address:
146 OAKLAND ST
MALDEN, MA 02148

Prop ID: 61.A-11-6
Prop Location: 11 COLONIAL VILLAGE DR UNIT K6
Arlington, MA
Owner: VAN MOORTEL MARJORIE
Co-Owner:
Mailing Address:
11 COLONIAL VILLAGE DR #6
ARLINGTON, MA 02474

Prop ID: 61.A-11-7
Prop Location: 11 COLONIAL VILLAGE DR UNIT K7
Arlington, MA
Owner: TU WENJIE
Co-Owner:
Mailing Address:
11 COLONIAL VILLAGE DR #7
ARLINGTON, MA 02474

Prop ID: 61.A-11-8
Prop Location: 11 COLONIAL VILLAGE DR UNIT K8
Arlington, MA
Owner: BURKE CHARLES TR
Co-Owner: C/O HILARIE CHANDLER MGMT
Mailing Address:
19 DOONAN STREET
TR OF S.R. REALTY TRUST
MEDFORD, MA 02155

Prop ID: 61.A-11-9
Prop Location: 11 COLONIAL VILLAGE DR UNIT K9
Arlington, MA
Owner: VEZNAIAN MARY
Co-Owner:
Mailing Address:
11 COLONIAL VILLAGE DR #9
ARLINGTON, MA 02474

Prop ID: 61.A-1-2
Prop Location: 1 COLONIAL VILLAGE DR UNIT A2
Arlington, MA
Owner: HERZBERG LORRIE
Co-Owner:
Mailing Address:
1 COLONIAL VILLAGE DR #2
ARLINGTON, MA 02474

Prop ID: 61.A-12-1
Prop Location: 12 COLONIAL VILLAGE DR UNIT L1
Arlington, MA
Owner: SONAM TENZIN
Co-Owner:
Mailing Address:
4 BRIDLE PATH
SUDBURY, MA 01776

Prop ID: 61.A-12-10
Prop Location: 12 COLONIAL VILLAGE DR UNIT L10
Arlington, MA
Owner: SHARP JOHN D & KENNETH G/ TRS
Co-Owner: 2019 CLIFFORD A SHARP
Mailing Address:
12 COLONIAL VILLAGE DR
UNIT 10
ARLINGTON, MA 02474

Prop ID: 61.A-12-11
Prop Location: 12 COLONIAL VILLAGE DR UNIT L11
Arlington, MA
Owner: MURPHY EDWARD
Co-Owner:
Mailing Address:
12 COLONIAL VILLAGE DR UNIT 11
ARLINGTON, MA 02474

Prop ID: 61.A-12-12
Prop Location: 12 COLONIAL VILLAGE DR UNIT L12
Arlington, MA
Owner: BAI DONGFANG
Co-Owner: FEI XINGYUAN
Mailing Address:
12 COLONIAL VILLAGE DR
APT 12
ARLINGTON, MA 02474

Prop ID: 61.A-12-2
Prop Location: 12 COLONIAL VILLAGE DR UNIT L2
Arlington, MA
Owner: LAZURE PETER B/ LIFE ESTATE
Co-Owner:
Mailing Address:
12 COLONIAL VILLAGE DR
UNIT 2
ARLINGTON, MA 02474

Prop ID: 61.A-12-3
Prop Location: 12 COLONIAL VILLAGE DR UNIT L3
Arlington, MA
Owner: DAY STEVEN J
Co-Owner:
Mailing Address:
12 COLONIAL VILLAGE DR #3
ARLINGTON, MA 02474

Prop ID: 61.A-12-4
Prop Location: 12 COLONIAL VILLAGE DR UNIT L4
Arlington, MA
Owner: JONES MARILYN J & RICHARD C/ TRS
Co-Owner: JONES 2020 FAMILY TRUST
Mailing Address:
225 PHEASANT AVE
ARLINGTON, MA 02474

Prop ID: 61.A-12-5
Prop Location: 12 COLONIAL VILLAGE DR UNIT L5
Arlington, MA
Owner: MORILLO-TAYLOR LILIANA
Co-Owner:
Mailing Address:
2675 MONTROSE PL
SANTA BARBARA, CA 93105

Prop ID: 61.A-12-6
Prop Location: 12 COLONIAL VILLAGE DR UNIT L6
Arlington, MA
Owner: KUNWAR CHHABINDRA
Co-Owner: KUNWAR SUSHMA
Mailing Address:
12 COLONIAL VILLAGE DR #6
ARLINGTON, MA 02474

Prop ID: 61.A-12-7
Prop Location: 12 COLONIAL VILLAGE DR UNIT L7
Arlington, MA
Owner: MISAWA TAKAKO
Co-Owner:
Mailing Address:
12 COLONIAL VILLAGE DR #7
ARLINGTON, MA 02474

Prop ID: 61.A-12-8
Prop Location: 12 COLONIAL VILLAGE DR UNIT L8
Arlington, MA
Owner: PIRNIA SHAHRZAD
Co-Owner:
Mailing Address:
21409 DAVIS MILL RD
GERMANTOWN, MD 20876

Prop ID: 61.A-12-9
Prop Location: 12 COLONIAL VILLAGE DR UNIT L9
Arlington, MA
Owner: FERREIRA JOYCE P
Co-Owner:
Mailing Address:
12 COLONIAL VILLAGE DR #9
ARLINGTON, MA 02474

Prop ID: 61.A-1-3
Prop Location: 1 COLONIAL VILLAGE DR UNIT A3
Arlington, MA
Owner: FARINO CARLOS
Co-Owner: FARINO-VIDAL ZORAYDA
Mailing Address:
4 SYLVIA ST
LEXINGTON, MA 02421

Prop ID: 61.A-1-4
Prop Location: 1 COLONIAL VILLAGE DR UNIT A4
Arlington, MA
Owner: HE JIANG
Co-Owner: YAO TIANQING
Mailing Address:
1 COLONIAL VILLAGE DR
#4
ARLINGTON, MA 02474

Prop ID: 61.A-1-5
Prop Location: 1 COLONIAL VILLAGE DR UNIT A5
Arlington, MA
Owner: WU DAI
Co-Owner:
Mailing Address:
1 COLONIAL VILLAGE DR #5
ARLINGTON, MA 02474

Prop ID: 61.A-1-6
Prop Location: 1 COLONIAL VILLAGE DR UNIT A6
Arlington, MA
Owner: CARSER DIANE L
Co-Owner:
Mailing Address:
1 COLONIAL VILLAGE DR #6
ARLINGTON, MA 02474

Prop ID: 61.A-1-7
Prop Location: 1 COLONIAL VILLAGE DR UNIT A7
Arlington, MA
Owner: ISMAYLOV DMITRIY
Co-Owner:
Mailing Address:
48 SHADY HILL RD
WESTON, MA 02493

Prop ID: 61.A-1-8
Prop Location: 1 COLONIAL VILLAGE DR UNIT A8
Arlington, MA
Owner: WANG PINGLANG & YING
Co-Owner:
Mailing Address:
35 SKYLINE DR
STATEN ISLAND, NY 10304

Prop ID: 61.A-1-9
Prop Location: 1 COLONIAL VILLAGE DR UNIT A9
Arlington, MA
Owner: SABIO DARIO R & JOSEFINA B/TRS
Co-Owner: SABIO FMLY REVOCABLE LIVING TR
Mailing Address:
10598 SANTERNO ST
LAS VEGAS, NV 89141

Prop ID: 61.A-2-1
Prop Location: 2 COLONIAL VILLAGE DR UNIT B1
Arlington, MA
Owner: DONG JENNIFER Q
Co-Owner: HAN XIAOGANG
Mailing Address:
508 LOWELL ST
LEXINGTON, MA 02420

Prop ID: 61.A-2-10
Prop Location: 2 COLONIAL VILLAGE DR UNIT B10
Arlington, MA
Owner: TAM THOMAS &
Co-Owner: TAM WINNIE YIN
Mailing Address:
25 WINCHESTER DRIVE
LEXINGTON, MA 02420

Prop ID: 61.A-2-11
Prop Location: 2 COLONIAL VILLAGE DR UNIT B11
Arlington, MA
Owner: RAMSAY RAYLENE L
Co-Owner:
Mailing Address:
2 COLONIAL VILLAGE DR #11
ARLINGTON, MA 02474

Prop ID: 61.A-2-12
Prop Location: 2 COLONIAL VILLAGE DR UNIT B12
Arlington, MA
Owner: TANO YUKI NOBU
Co-Owner:
Mailing Address:
2 COLONIAL VILLAGE DR #12
ARLINGTON, MA 02474

Prop ID: 61.A-2-2
Prop Location: 2 COLONIAL VILLAGE DR UNIT B2
Arlington, MA
Owner: SQUIRES PROPERTIES LLC
Co-Owner:
Mailing Address:
344 BISHOPS FOREST DR
WALTHAM, MA 02452

Prop ID: 61.A-2-3
Prop Location: 2 COLONIAL VILLAGE DR UNIT B3
Arlington, MA
Owner: BERGMAN BRUCE L
Co-Owner:
Mailing Address:
2 COLONIAL VILLAGE DR #3
ARLINGTON, MA 02474

Prop ID: 61.A-2-4
Prop Location: 2 COLONIAL VILLAGE DR UNIT B4
Arlington, MA
Owner: LEDDY WILLIAM A
Co-Owner:
Mailing Address:
2 COLONIAL VILLAGE DR #4
ARLINGTON, MA 02474

Prop ID: 61.A-2-5
Prop Location: 2 COLONIAL VILLAGE DR UNIT B5
Arlington, MA
Owner: ZHANG YUANYE
Co-Owner: HAO XINMING
Mailing Address:
60 ALBEMARLE AVE
LEXINGTON, MA 02420

Prop ID: 61.A-2-6
Prop Location: 2 COLONIAL VILLAGE DR UNIT B6
Arlington, MA
Owner: MORONEY KEVIN F & PAUL R/TRS
Co-Owner: MORONEY FAMILY REALTY TRUST
Mailing Address:
2 COLONIAL VILLAGE DR #6
ARLINGTON, MA 02474

Prop ID: 61.A-2-7
Prop Location: 2 COLONIAL VILLAGE DR UNIT B7
Arlington, MA
Owner: QUAN SUSAN
Co-Owner:
Mailing Address:
67 SLADE ST
BELMONT, MA 02478

Prop ID: 61.A-2-8
Prop Location: 2 COLONIAL VILLAGE DR UNIT B8
Arlington, MA
Owner: WANG ROBERT T & KATHY K/TRS
Co-Owner: WANG REALTY TRUST
Mailing Address:
402 HEATHER DR
LYNNFIELD, MA 01940

Prop ID: 61.A-2-9
Prop Location: 2 COLONIAL VILLAGE DR UNIT B9
Arlington, MA
Owner: WANG LIANGYUN
Co-Owner:
Mailing Address:
75 SAINT ALPHONSUS ST
BOSTON, MA 02120

Prop ID: 61.A-3-1
Prop Location: 3 COLONIAL VILLAGE DR UNIT C1
Arlington, MA
Owner: COSTA MARIA C
Co-Owner:
Mailing Address:
39 BENTON RD
SOMERVILLE, MA 02143

Prop ID: 61.A-3-10
Prop Location: 3 COLONIAL VILLAGE DR UNIT C10
Arlington, MA
Owner: CRONIN WILLIAM E JR
Co-Owner:
Mailing Address:
327 LOWELL ST
LEXINGTON, MA 02420

Prop ID: 61.A-3-11
Prop Location: 3 COLONIAL VILLAGE DR UNIT C11
Arlington, MA
Owner: KINIRY JOHN J JR
Co-Owner:
Mailing Address:
3 COLONIAL VILLAGE DR #11
ARLINGTON, MA 02474

Prop ID: 61.A-3-12
Prop Location: 3 COLONIAL VILLAGE DR UNIT C12
Arlington, MA
Owner: DITROIA ELIZABETH
Co-Owner:
Mailing Address:
3 COLONIAL VILLAGE DR # 12
ARLINGTON, MA 02474

Prop ID: 61.A-3-2
Prop Location: 3 COLONIAL VILLAGE DR UNIT C2
Arlington, MA
Owner: BENNETT FREDERICK
Co-Owner: BENNETT YUAN WEI MARY
Mailing Address:
3 COLONIAL VILLAGE DR #2
ARLINGTON, MA 02474

Prop ID: 61.A-3-3
Prop Location: 3 COLONIAL VILLAGE DR UNIT C3
Arlington, MA
Owner: LEE RICHARD
Co-Owner:
Mailing Address:
3 COLONIAL VILLAGE DR #3
ARLINGTON, MA 02474

Prop ID: 61.A-3-4
Prop Location: 3 COLONIAL VILLAGE DR UNIT C4
Arlington, MA
Owner: ARLINGTON COLONIAL LLC
Co-Owner:
Mailing Address:
26 SADDLE CLUB RD
LEXINGTON, MA 02420

Prop ID: 61.A-3-5
Prop Location: 3 COLONIAL VILLAGE DR UNIT C5
Arlington, MA
Owner: FENG DUANSI
Co-Owner:
Mailing Address:
3 COLONIAL VILLAGE DR #5
ARLINGTON, MA 02474

Prop ID: 61.A-3-6
Prop Location: 3 COLONIAL VILLAGE DR UNIT C6
Arlington, MA
Owner: THAMES THOMAS L
Co-Owner: THAMES ELLEN M
Mailing Address:
3 COLONIAL VILLAGE DR #6
ARLINGTON, MA 02474

Prop ID: 61.A-3-7
Prop Location: 3 COLONIAL VILLAGE DR UNIT C7
Arlington, MA
Owner: CAMERON MELANIE
Co-Owner:
Mailing Address:
9 PRINCETON ROAD
ARLINGTON, MA 02474

Prop ID: 61.A-3-8
Prop Location: 3 COLONIAL VILLAGE DR UNIT C8
Arlington, MA
Owner: WANG ROBERT T & KATHY K/TRS
Co-Owner: WANG REALTY TRUST
Mailing Address:
402 HEATHER RD
LYNNFIELD, MA 01940

Prop ID: 61.A-3-9
Prop Location: 3 COLONIAL VILLAGE DR UNIT C9
Arlington, MA
Owner: LARSEN DAVID L
Co-Owner:
Mailing Address:
14 WESTERN AVE UNIT 2
GLOUCESTER, MA 01930

Prop ID: 61.A-4-1
Prop Location: 4 COLONIAL VILLAGE DR UNIT D1
Arlington, MA
Owner: JUNG JONATHAN
Co-Owner:
Mailing Address:
4 COLONIAL VILLAGE DR #1
ARLINGTON, MA 02474

Prop ID: 61.A-4-10
Prop Location: 4 COLONIAL VILLAGE DR UNIT D10
Arlington, MA
Owner: THOMPSON JOHN R & JUDITH
Co-Owner:
Mailing Address:
20 CONNOLLY RD
BILLERICA, MA 01821

Prop ID: 61.A-4-11
Prop Location: 4 COLONIAL VILLAGE DR UNIT D11
Arlington, MA
Owner: ONEIL EMILY
Co-Owner:
Mailing Address:
4 COLONIAL VILLAGE DR #11
ARLINGTON, MA 02474

Prop ID: 61.A-4-12
Prop Location: 4 COLONIAL VILLAGE DR UNIT D12
Arlington, MA
Owner: COMMONWEALTH BOSTON REALTY LLC
Co-Owner:
Mailing Address:
111 PERKINS STREET #192
JAMAICA PLAIN, MA 02130

Prop ID: 61.A-4-2
Prop Location: 4 COLONIAL VILLAGE DR UNIT D2
Arlington, MA
Owner: COLONIAL VILLAGE CONDOMINIUM
Co-Owner: TRUST
Mailing Address:
C/O DEPT 368 FIRST REALTY MANAGEMENT COR
PO BOX 4579
HOUSTON, TX 77210-4579

Prop ID: 61.A-4-3
Prop Location: 4 COLONIAL VILLAGE DR UNIT D3
Arlington, MA
Owner: JOHNSON CARL R
Co-Owner:
Mailing Address:
75 WILSON RD
BEDFORD, MA 01730

Prop ID: 61.A-4-4
Prop Location: 4 COLONIAL VILLAGE DR UNIT D4
Arlington, MA
Owner: SHIEH TONY TUNG HSIEN
Co-Owner: CHAN WING CHI
Mailing Address:
50 CHANDLER RD
BURLINGTON, MA 01803

Prop ID: 61.A-4-5
Prop Location: 4 COLONIAL VILLAGE DR UNIT D5
Arlington, MA
Owner: JENNINGS LAURIE/TRUSTEE
Co-Owner: SANDRA L FJELD 2017 IRREVOCABL
Mailing Address:
4 COLONIAL VILLAGE DR #5
ARLINGTON, MA 02474

Prop ID: 61.A-4-6
Prop Location: 4 COLONIAL VILLAGE DR UNIT D6
Arlington, MA
Owner: MANANDHAR ANILA
Co-Owner:
Mailing Address:
2 ST MARY`S RD
BURLINGTON, MA 01803

Prop ID: 61.A-4-7
Prop Location: 4 COLONIAL VILLAGE DR UNIT D7
Arlington, MA
Owner: PHAM GIANG T M
Co-Owner:
Mailing Address:
4 COLONIAL VILLAGE DR #7
ARLINGTON, MA 02474

Prop ID: 61.A-4-8
Prop Location: 4 COLONIAL VILLAGE DR UNIT D8
Arlington, MA
Owner: XIE CHAO
Co-Owner: YAN MINGLI
Mailing Address:
47 SOMERSET RD
LEXINGTON, MA 02420

Prop ID: 61.A-4-9
Prop Location: 4 COLONIAL VILLAGE DR UNIT D9
Arlington, MA
Owner: KIM MYUNG HEE
Co-Owner:
Mailing Address:
131 COOLIDGE AVE UNIT 128
WATERTOWN, MA 02472-2847

Prop ID: 61.A-5-1
Prop Location: 5 COLONIAL VILLAGE DR UNIT E1
Arlington, MA
Owner: LEXINGTON REALTY HOLDINGS LLC
Co-Owner:
Mailing Address:
PO BOX 134
LEXINGTON, MA 02420

Prop ID: 61.A-5-10
Prop Location: 5 COLONIAL VILLAGE DR UNIT E10
Arlington, MA
Owner: OCALLAGHAN KELLY &
Co-Owner: SCHNEIDER BRENDYN
Mailing Address:
5 COLONIAL VILLAGE DR #10
ARLINGTON, MA 02474

Prop ID: 61.A-5-11
Prop Location: 5 COLONIAL VILLAGE DR UNIT E11
Arlington, MA
Owner: CHENG HUI
Co-Owner: WANG HUI
Mailing Address:
5 COLONIAL VILLAGE DR #11
ARLINGTON, MA 02474

Prop ID: 61.A-5-12
Prop Location: 5 COLONIAL VILLAGE DR UNIT E12
Arlington, MA
Owner: HUANG GRACE
Co-Owner:
Mailing Address:
5 COLONIAL VILLAGE DR #12
ARLINGTON, MA 02476

Prop ID: 61.A-5-2
Prop Location: 5 COLONIAL VILLAGE DR UNIT E2
Arlington, MA
Owner: COLARUSSO PROPERTIES LLC
Co-Owner:
Mailing Address:
22 MILL ST SUITE 305
ARLINGTON, MA 02476

Prop ID: 61.A-5-3
Prop Location: 5 COLONIAL VILLAGE DR UNIT E3
Arlington, MA
Owner: SMITH IRENE H
Co-Owner:
Mailing Address:
5 COLONIAL VILLAGE DR #3
ARLINGTON, MA 02474

Prop ID: 61.A-5-4
Prop Location: 5 COLONIAL VILLAGE DR UNIT E4
Arlington, MA
Owner: JAIN SUJIT G
Co-Owner: GOLECHA PRATIBHA S
Mailing Address:
30 APPLETON PL UNIT 2
ARLINGTON, MA 02476

Prop ID: 61.A-5-5
Prop Location: 5 COLONIAL VILLAGE DR UNIT E5
Arlington, MA
Owner: WU PHILIP C
Co-Owner:
Mailing Address:
10 BROADWAY PL APT 3
SOMERVILLE, MA 02145

Prop ID: 61.A-5-6
Prop Location: 5 COLONIAL VILLAGE DR UNIT E6
Arlington, MA
Owner: GROSS GERALDINE R
Co-Owner:
Mailing Address:
5 COLONIAL VILLAGE DR #6
ARLINGTON, MA 02474

Prop ID: 61.A-5-7
Prop Location: 5 COLONIAL VILLAGE DR UNIT E7
Arlington, MA
Owner: AHMARI SOHRAB
Co-Owner:
Mailing Address:
5 COLONIAL VILLAGE DR #7
ARLINGTON, MA 02474

Prop ID: 61.A-5-8
Prop Location: 5 COLONIAL VILLAGE DR UNIT E8
Arlington, MA
Owner: MASKEY ANURAG
Co-Owner: SHRESTHA SHACHI
Mailing Address:
47 WALLACE ST
NEWTON HIGHLANDS, MA 02461

Prop ID: 61.A-5-9
Prop Location: 5 COLONIAL VILLAGE DR UNIT E9
Arlington, MA
Owner: LAWSON MARTHA A
Co-Owner:
Mailing Address:
70 MT VERNON ST
HAVERHILL, MA 01830

Prop ID: 61.A-6-1
Prop Location: 6 COLONIAL VILLAGE DR UNIT F1
Arlington, MA
Owner: MENDEZ VICTOR F
Co-Owner:
Mailing Address:
11 RICHARDSON RD
STONEHAM, MA 02180

Prop ID: 61.A-6-10
Prop Location: 6 COLONIAL VILLAGE DR UNIT F10
Arlington, MA
Owner: WOLFE DANIEL P
Co-Owner:
Mailing Address:
6 COLONIAL VILLAGE DR #10
ARLINGTON, MA 02474

Prop ID: 61.A-6-11
Prop Location: 6 COLONIAL VILLAGE DR UNIT F11
Arlington, MA
Owner: HARRIS JEFFREY M
Co-Owner:
Mailing Address:
6 COLONIAL VILLAGE DR #11
ARLINGTON, MA 02474

Prop ID: 61.A-6-12
Prop Location: 6 COLONIAL VILLAGE DR UNIT F12
Arlington, MA
Owner: LEE FONG-CHANG
Co-Owner: LEE SHIU-IN
Mailing Address:
C/O JOSEPH LEE
1531 LUDINGTON AVE
WESLEY CHAPEL, FL 33543

Prop ID: 61.A-6-2
Prop Location: 6 COLONIAL VILLAGE DR UNIT F2
Arlington, MA
Owner: CATALDI MAUREEN
Co-Owner:
Mailing Address:
6 COLONIAL VILLAGE DR UNIT 2
ARLINGTON, MA 02474

Prop ID: 61.A-6-3
Prop Location: 6 COLONIAL VILLAGE DR UNIT F3
Arlington, MA
Owner: RANNEY ROGER ERIC
Co-Owner:
Mailing Address:
6 COLONIAL VILLAGE DR #3
ARLINGTON, MA 02474

Prop ID: 61.A-6-4
Prop Location: 6 COLONIAL VILLAGE DR UNIT F4
Arlington, MA
Owner: MEI KATHY XIUWEN
Co-Owner:
Mailing Address:
32 ARCOLA ST
LEXINGTON, MA 02420

Prop ID: 61.A-6-5
Prop Location: 6 COLONIAL VILLAGE DR UNIT F5
Arlington, MA
Owner: SHENG JIANXIONG &
Co-Owner: LIU WENYING
Mailing Address:
6 COLONIAL VILLAGE DR #5
ARLINGTON, MA 02474

Prop ID: 61.A-6-6
Prop Location: 6 COLONIAL VILLAGE DR UNIT F6
Arlington, MA
Owner: BRIGHTMAN HELEN A ETAL/TRUSTEE
Co-Owner: BRIGHTMAN NOMINEE REALTY TRUST
Mailing Address:
13 EDSON ST
NASHUA, NH 03064

Prop ID: 61.A-6-7
Prop Location: 6 COLONIAL VILLAGE DR UNIT F7
Arlington, MA
Owner: MACAULEY LYNNE A
Co-Owner:
Mailing Address:
6 COLONIAL VILLAGE DR #7
ARLINGTON, MA 02474

Prop ID: 61.A-6-8
Prop Location: 6 COLONIAL VILLAGE DR UNIT F8
Arlington, MA
Owner: ZHANG YANFANG
Co-Owner: CUI JIKE
Mailing Address:
78 MAPLE ST
BELMONT, MA 02478

Prop ID: 61.A-6-9
Prop Location: 6 COLONIAL VILLAGE DR UNIT F9
Arlington, MA
Owner: PERKINS ELLIOTT W & ANITA C
Co-Owner: TRS/ PERKINS FAMILY TRUST
Mailing Address:
17 STEEPLE CHASE CIRCLE
WESTFORD, MA 01886

Prop ID: 61.A-7-1
Prop Location: 7 COLONIAL VILLAGE DR UNIT G1
Arlington, MA
Owner: LAMB MARTHA
Co-Owner:
Mailing Address:
7 COLONIAL VILLAGE DR #1
ARLINGTON, MA 02474

Prop ID: 61.A-7-10
Prop Location: 7 COLONIAL VILLAGE DR UNIT G10
Arlington, MA
Owner: GIOVINAZZO EMMA
Co-Owner:
Mailing Address:
7 COLONIAL VILLAGE DR #10
ARLINGTON, MA 02474

Prop ID: 61.A-7-11
Prop Location: 7 COLONIAL VILLAGE DR UNIT G11
Arlington, MA
Owner: MUSE CAROLYN M & JAMES A
Co-Owner:
Mailing Address:
1 PONDEROSA DR
PELHAM, NH 03076

Prop ID: 61.A-7-12
Prop Location: 7 COLONIAL VILLAGE DR UNIT G12
Arlington, MA
Owner: AUSTIN ALEXANDER B
Co-Owner:
Mailing Address:
7 COLONIAL VILLAGE DR #12
ARLINGTON, MA 02474

Prop ID: 61.A-7-2
Prop Location: 7 COLONIAL VILLAGE DR UNIT G2
Arlington, MA
Owner: JANTZ JOAN E
Co-Owner:
Mailing Address:
7 COLONIAL VILLAGE DR #2
ARLINGTON, MA 02474

Prop ID: 61.A-7-3
Prop Location: 7 COLONIAL VILLAGE DR UNIT G3
Arlington, MA
Owner: FARRELL MICHAEL W
Co-Owner: STEIN BRITTANY T
Mailing Address:
7 COLONIAL VILLAGE DR #3
ARLINGTON, MA 02474

Prop ID: 61.A-7-4
Prop Location: 7 COLONIAL VILLAGE DR UNIT G4
Arlington, MA
Owner: MAUGEL NATHAN/JENNIFER
Co-Owner:
Mailing Address:
60 MUNROE DR
EAST HAMPSTEAD, NH 03826

Prop ID: 61.A-7-5
Prop Location: 7 COLONIAL VILLAGE DR UNIT G5
Arlington, MA
Owner: SHIU PLACID K
Co-Owner:
Mailing Address:
19 GRANT PL
LEXINGTON, MA 02420

Prop ID: 61.A-7-6
Prop Location: 7 COLONIAL VILLAGE DR UNIT G6
Arlington, MA
Owner: MAHER DAVID F/TRUSTEE
Co-Owner: 7 COLONIAL TRUST
Mailing Address:
966 BROADWAY
SOMERVILLE, MA 02144

Prop ID: 61.A-7-7
Prop Location: 7 COLONIAL VILLAGE DR UNIT G7
Arlington, MA
Owner: SIEGEL JULES
Co-Owner:
Mailing Address:
1010 WALTHAM ST APT 295
LEXINGTON, MA 02421

Prop ID: 61.A-7-8
Prop Location: 7 COLONIAL VILLAGE DR UNIT G8
Arlington, MA
Owner: ZHANG ZHENZHEN &
Co-Owner: CHEN KUN
Mailing Address:
58 CRESTVIEW RD
BELMONT, MA 02478

Prop ID: 61.A-7-9
Prop Location: 7 COLONIAL VILLAGE DR UNIT G9
Arlington, MA
Owner: SWARTS HEIDI
Co-Owner:
Mailing Address:
7 COLONIAL VILLAGE DR #9
ARLINGTON, MA 02474

Prop ID: 61.A-8-1
Prop Location: 8 COLONIAL VILLAGE DR UNIT H1
Arlington, MA
Owner: LEXINGTON REALTY HOLDINGS LLC
Co-Owner:
Mailing Address:
PO BOX 134
LEXINGTON, MA 02420

Prop ID: 61.A-8-10
Prop Location: 8 COLONIAL VILLAGE DR UNIT H10
Arlington, MA
Owner: JONAS MICHAEL
Co-Owner:
Mailing Address:
8 COLONIAL VILLAGE DR #10
ARLINGTON, MA 02476

Prop ID: 61.A-8-11
Prop Location: 8 COLONIAL VILLAGE DR UNIT H11
Arlington, MA
Owner: RAHMATPOUR SOHAILA--ETAL
Co-Owner: NAKHAEE HAMID
Mailing Address:
20 OVERBROOK DRIVE
WELLESLEY, MA 02482

Prop ID: 61.A-8-12
Prop Location: 8 COLONIAL VILLAGE DR UNIT H12
Arlington, MA
Owner: MILLER CHERYL S
Co-Owner:
Mailing Address:
8 COLONIAL VILLAGE DR #12
ARLINGTON, MA 02474

Prop ID: 61.A-8-2
Prop Location: 8 COLONIAL VILLAGE DR UNIT H2
Arlington, MA
Owner: KNIGHT WILL
Co-Owner:
Mailing Address:
8 COLONIAL VILLAGE DR #2
ARLINGTON, MA 02474

Prop ID: 61.A-8-3
Prop Location: 8 COLONIAL VILLAGE DR UNIT H3
Arlington, MA
Owner: ELANBRI NOUREDDINE
Co-Owner: AZMANI WAFA
Mailing Address:
8 COLONIAL VILLAGE DR #3
ARLINGTON, MA 02474

Prop ID: 61.A-8-4
Prop Location: 8 COLONIAL VILLAGE DR UNIT H4
Arlington, MA
Owner: NADJARIAN VATCHE
Co-Owner:
Mailing Address:
8 COLONIAL VILLAGE DR
UNIT 4
ARLINGTON, MA 02474

Prop ID: 61.A-8-5
Prop Location: 8 COLONIAL VILLAGE DR UNIT H5
Arlington, MA
Owner: KING ALLISON J
Co-Owner:
Mailing Address:
8 COLONIAL VILLAGE DR #5
ARLINGTON, MA 02474

Prop ID: 61.A-8-6
Prop Location: 8 COLONIAL VILLAGE DR UNIT H6
Arlington, MA
Owner: HUEY JEFFREY K
Co-Owner:
Mailing Address:
8 COLONIAL VILLAGE DR APT 6
ARLINGTON, MA 02474

Prop ID: 61.A-8-7
Prop Location: 8 COLONIAL VILLAGE DR UNIT H7
Arlington, MA
Owner: SHEEHAN KEVIN/ANDREA
Co-Owner:
Mailing Address:
228 FOX HILL RD
BURLINGTON, MA 01803

Prop ID: 61.A-8-8
Prop Location: 8 COLONIAL VILLAGE DR UNIT H8
Arlington, MA
Owner: RUSSO ANMARIE
Co-Owner:
Mailing Address:
8 COLONIAL VILLAGE DR #8
ARLINGTON, MA 02474

Prop ID: 61.A-8-9
Prop Location: 8 COLONIAL VILLAGE DR UNIT H9
Arlington, MA
Owner: LIU QING
Co-Owner: LI SHUANGLIAN
Mailing Address:
8 COLONIAL VILLAGE DR #9
ARLINGTON, MA 02474

Prop ID: 61.A-9-1
Prop Location: 9 COLONIAL VILLAGE DR UNIT I1
Arlington, MA
Owner: GOODWIN DESIREE
Co-Owner:
Mailing Address:
9 COLONIAL VILLAGE DR #1
ARLINGTON, MA 02474

Prop ID: 61.A-9-10
Prop Location: 9 COLONIAL VILLAGE DR UNIT I10
Arlington, MA
Owner: PRESTON DIANE
Co-Owner:
Mailing Address:
186 NEWPORT ST
ARLINGTON, MA 02476

Prop ID: 61.A-9-11
Prop Location: 9 COLONIAL VILLAGE DR UNIT I11
Arlington, MA
Owner: VALDETTARO VERONIQUE A
Co-Owner:
Mailing Address:
9 COLONIAL VILLAGE DR #11
ARLINGTON, MA 02474

Prop ID: 61.A-9-12
Prop Location: 9 COLONIAL VILLAGE DR UNIT I12
Arlington, MA
Owner: FLEMING ELLEN T
Co-Owner:
Mailing Address:
9 COLONIAL VILLAGE DR #12
ARLINGTON, MA 02474

Prop ID: 61.A-9-2
Prop Location: 9 COLONIAL VILLAGE DR UNIT 2
Arlington, MA
Owner: NEWMARK GERRY G
Co-Owner:
Mailing Address:
9 COLONIAL VILLAGE DR #2
ARLINGTON, MA 02474

Prop ID: 61.A-9-3
Prop Location: 9 COLONIAL VILLAGE DR UNIT I3
Arlington, MA
Owner: ELBANNAN SAMAA
Co-Owner:
Mailing Address:
39 PINE HILL RD
BEDFORD, MA 01730

Prop ID: 61.A-9-4
Prop Location: 9 COLONIAL VILLAGE DR UNIT I4
Arlington, MA
Owner: DONOVAN JOANNE
Co-Owner:
Mailing Address:
9 COLONIAL VILLAGE DR #14
ARLINGTON, MA 02474

Prop ID: 61.A-9-5
Prop Location: 9 COLONIAL VILLAGE DR UNIT I5
Arlington, MA
Owner: LAI RALPH W M & CINDY S T
Co-Owner:
Mailing Address:
28 CORNERSTONE CT
DOYLESTOWN, PA 18901

Prop ID: 61.A-9-6
Prop Location: 9 COLONIAL VILLAGE DR UNIT I6
Arlington, MA
Owner: WANG PINGLANG & YING
Co-Owner:
Mailing Address:
35 SKYLINE DR
STATEN ISLAND, NY 10304

Prop ID: 61.A-9-7
Prop Location: 9 COLONIAL VILLAGE DR UNIT I7
Arlington, MA
Owner: ZHANG YANFANG &
Co-Owner: CUI JIKE
Mailing Address:
78 MAPLE ST
BELMONT, MA 02478

Prop ID: 61.A-9-8
Prop Location: 9 COLONIAL VILLAGE DR UNIT I8
Arlington, MA
Owner: SHINGU IKUE
Co-Owner:
Mailing Address:
9 COLONIAL VILLAGE DR #8
ARLINGTON, MA 02474

Prop ID: 61.A-9-9
Prop Location: 9 COLONIAL VILLAGE DR UNIT I9
Arlington, MA
Owner: MAC INNES PATRICIA
Co-Owner:
Mailing Address:
32 ST CATHERINE RD
NORWOOD, MA 02062

Prop ID: 62-1-4.A
Prop Location: 16-38 DRAKE RD Arlington, MA
Owner: ARLINGTON HOUSING AUTHORITY
Co-Owner: DRAKE VILLAGE
Mailing Address:
730 MASS AVE
ARLINGTON, MA 02476

Prop ID: 85-1-7
Prop Location: 4 WESTMORELAND AVE Arlington, MA
Owner: CALLAGHAN OWEN & JESSICA
Co-Owner:
Mailing Address:
4 WESTMORELAND AVE
ARLINGTON, MA 02474

Prop ID: 85-1-8
Prop Location: 239 LOWELL ST Arlington, MA
Owner: VERDERESE JOHN T
Co-Owner:
Mailing Address:
239 LOWELL STREET
ARLINGTON, MA 02474

Prop ID: 85-1-9
Prop Location: 243 LOWELL ST Arlington, MA
Owner: WYATT PATRICIA L
Co-Owner:
Mailing Address:
243 LOWELL STREET
ARLINGTON, MA 02474

Prop ID: 85-4-14
Prop Location: 3 WESTMORELAND AVE Arlington, MA
Owner: ENG DAVID H
Co-Owner: CANTY ANDREA M
Mailing Address:
3 WESTMORELAND AVE
ARLINGTON, MA 02474

Prop ID: 85-4-15
Prop Location: 221 LOWELL ST Arlington, MA
Owner: LAMONT STUART & BARBARA
Co-Owner:
Mailing Address:
221 LOWELL STREET
ARLINGTON, MA 02474

Prop ID: 85-4-16
Prop Location: 219 LOWELL ST Arlington, MA
Owner: SMITH ROBERT G & JANE R
Co-Owner:
Mailing Address:
219 LOWELL STREET
ARLINGTON, MA 02474

Prop ID: 85-4-21
Prop Location: 7 WEST COURT TERR Arlington, MA
Owner: STROK GAVIN M
Co-Owner: STROK MARIE-CAROLINE
Mailing Address:
7 WEST COURT TERR
ARLINGTON, MA 02474

Prop ID: 85-4-22
Prop Location: 207 LOWELL ST Arlington, MA
Owner: MARTENS CHINA L
Co-Owner: MARTENS SIEGFRIED
Mailing Address:
207 LOWELL STREET
ARLINGTON, MA 02474

Prop ID: 85-4-23
Prop Location: 203 LOWELL ST Arlington, MA
Owner: SALOCKS JEFFREY D--ETAL
Co-Owner: STAFFORD SHARON L
Mailing Address:
203 LOWELL STREET
ARLINGTON, MA 02474

Prop ID: 85-4-26
Prop Location: 197 LOWELL ST Arlington, MA
Owner: GETTLER JUSTIN B & HOLLY K
Co-Owner:
Mailing Address:
197 LOWELL ST
ARLINGTON, MA 02474

Prop ID: 86-5-10.A
Prop Location: 255 LOWELL ST Arlington, MA
Owner: GALVIN ANNE M
Co-Owner:
Mailing Address:
255 LOWELL ST
ARLINGTON, MA 02474

Prop ID: 86-5-10.B
Prop Location: 0-LOT LOWELL ST Arlington, MA
Owner: PLANT SUSAN W
Co-Owner: CHO DANYUL Y
Mailing Address:
257 LOWELL STREET
ARLINGTON, MA 02474

Prop ID: 86-5-11
Prop Location: 257 LOWELL ST Arlington, MA
Owner: PLANT SUSAN W
Co-Owner: CHO DANYUL Y
Mailing Address:
257 LOWELL STREET
ARLINGTON, MA 02474

Prop ID: 86-5-12
Prop Location: 261 LOWELL ST Arlington, MA
Owner: SOUCY PAUL EDWARD
Co-Owner: SILVERMAN MELANIE TIA
Mailing Address:
261 LOWELL STREET
ARLINGTON, MA 02474

Prop ID: 86-5-13
Prop Location: 265 LOWELL ST Arlington, MA
Owner: CHARLIER-MATTHEWS REBECCA
Co-Owner: KOSMATKA KRISTOPHER
Mailing Address:
265 LOWELL ST
ARLINGTON, MA 02474

Prop ID: 86-5-14
Prop Location: 269 LOWELL ST Arlington, MA
Owner: CANADAY JOHN T
Co-Owner:
Mailing Address:
269 LOWELL ST
ARLINGTON, MA 02474

Prop ID: 86-5-15
Prop Location: 271 LOWELL ST Arlington, MA
Owner: GEISSLER GARY J
Co-Owner:
Mailing Address:
1 LOWELL STREET
LEXINGTON, MA 02420

Prop ID: 86-5-9
Prop Location: 251 LOWELL ST Arlington, MA
Owner: ALLEN THOMAS J &
Co-Owner: SENESE MARGARET D
Mailing Address:
251 LOWELL STREET
ARLINGTON, MA 02474

Notification to Abutters Under the Massachusetts Wetlands Protection Act and Arlington Wetlands Protection Bylaw

In accordance with the second paragraph of Massachusetts General Laws Chapter 131, Section 40, and the Arlington Wetlands Protection Bylaw, you are hereby notified of the following:

The Conservation Commission will hold a public hearing on Thursday, December 17, 2020 at 7:30pm in accordance with the provisions of the Mass. Wetlands Protection Act (M.G.L. Ch. 131, s. 40, as amended) and the Town of Arlington By-Laws Article 8, By-Law for Wetland Protection, for a Notice of Intent from the Town of Arlington Parks & Recreation Commission, for the Arlington Reservoir Renovation Project Phase II, which includes parking area improvements, installation of new ADA-accessible pathways, new recreational facilities, a boat launch, bathing beach improvements, bank stabilization measures, and invasive species control / upland habitat restoration at the Arlington Reservoir, within regulated wetland resource areas and buffer zones, on Assessor's Property Map/Lot 61-1-4 in Arlington. *Due to COVID-19, please refer to the town website for information on the location of the meeting or virtual (Zoom) meeting information. Conservation Commission agendas are posted on their website at least 48 hours in advance at: https://www.arlingtonma.gov/town-governance/boards-and-committees/conservation-commission.*

A copy of the application and accompanying plans are available for inspection Mon. - Fri. 8am-noon at the Conservation Commission office, first floor of the Town Hall Annex, 730 Massachusetts Avenue and by request via email at Rebecca.weissman@swca.com. *(Please note that the town hall may be closed or office hours reduced due to COVID-19 concerns).*

For more information call the Town of Arlington Parks and Recreation Commission at 781-316-3880 or the Arlington Conservation Commission at 781-316-3012, or the DEP Northeast Regional Office, 978-694-3200.

NOTE: Notice of the Public Hearing will be published at least five (5) days in advance in *The Arlington Advocate* and be posted not less than 48 hours in advance in the Arlington Town Hall of the public hearing.

AFFIDAVIT OF SERVICE

(Return to Conservation Commission)

I, Becky Barber, being duly sworn, do hereby state as follows: on December 3, 2020, I mailed a "Notification to Abutters" in compliance with the second paragraph of Massachusetts General Laws, Chapter 131, s.40, the DEP Guide to Abutter Notification dated April 8, l994, and the Arlington Wetlands Protection Bylaw, Title V, Article 8 of the Town of Arlington Bylaws in connection with the following matter: A Notice of Intent

The form of the notification, and a list of the abutters to whom it was provided and their addresses, are attached to this Affidavit of Service.
Signed under the pains and penalties of perjury, this 3rd day of December, 2020.

Becky Barber

Name

APPENDIX B

Figures

MASTER PLANNING IMPLEMENTATION FOR ARLINGTON RESERVOIR RECREATION AREA

Figure 1
USGS Topo

Project Area

Middlesex County, MA
USGS 7.5' Quadrangle: Lexington, MA, 42071-D2
NAD 1983 State Plane Massachusetts Mainland FIPS 2001 Feet
71.1888°W 42.4295°N

Base Map: ESRI ArcGIS Online, accessed November 2020

Updated: 11/6/2020
Project No. 60780
File: 60780 Figure 1 USGS Topo

N
1:24,000

Massachusetts

0 1,000 2,000 Feet
0 250 500 Meters

SWCA ENVIRONMENTAL CONSULTANTS

MASTER PLANNING IMPLEMENTATION FOR ARLINGTON RESERVOIR RECREATION AREA

Figure 2
Aerial Map

Project Area

Municipal Protected and Open Space

Private Protected and Open Space

Parcel

Middlesex County, MA
USGS 7.5' Quadrangle:
Lexington, MA, 42071-D2
NAD 1983 State Plane
Massachusetts Mainland
FIPS 2001 Feet
71.1888°W 42.4295°N

Base Map: ESRI ArcGIS Online, accessed November 2020

Updated: 11/12/2020
Project No. 60780
File: 60780 Figure 2 Environmental

N

1:5,000

Massachusetts

0 200 400 Feet

0 50 100 Meters

SWCA ENVIRONMENTAL CONSULTANTS

APPENDIX C

Site Photographs

All photographs taken July 17, 2020

Photo 1: Bathing Beach

Photo 2. Swim Area with Embankment on left.

Photo 3. Embankment. The surface is proposed to be improved for walking, and invasive species, including poison ivy to be removed.

All photographs taken July 17, 2020

Photo 4: Existing gravel parking lot. It is proposed to rebuild the parking lot with permeable materials to improve water quality in the Res.

Photo 5. Bank and slope erosion from parking lot overland runoff. The banks are proposed to be restored, and the stormwater will be infiltrated.

Photo 6. Typical bank and slope erosion along the Res. These areas are proposed to be restored and re-vegetated.

All photographs taken July 17, 2020

Photo 7: Existing Walking Path in Arlington proposed to be rebuilt and the adjacent bank/slopes restored.

Photo 8. Existing walking path in Lexington. Vegetation is dominated by invasive species proposed to be controlled.

Photo 9. Areas of significant bank erosion are proposed to be restored in the first phase of site work (west side of Res near Rindge Park).

APPENDIX D

Project Plans
(Under Separate Cover)

APPENDIX E

Stormwater Report
(Under Separate Cover)

TOWN OF ARLINGTON

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

100% DESIGN DEVELOPMENT SET

DRAWING LIST

G	COVER SHEET
L0	KEY PLAN
L1.1 – L1.5	SITE PREPARATION AND DEMO PLANS
L2.1 – L2.5	LAYOUT AND MATERIAL PLANS
L3.1 – L3.5	GRADING PLANS
L4.1 – L4.5	PLANTING PLANS
LD1.1 – LD1.9	LANDSCAPE DETAILS
C1.0	CIVIL DRAINAGE PLAN
C2.0	CIVIL DETAIL SHEETS
1.0	PROPOSED BANK RESTORATION AREAS
2.0	PROPOSED AREAS OF PHASE1 BANK RESTORATION
3.0	BANK RESTORATION SECTIONS
4.0	BANK RESTORATION DETAILS
5.0	BANK RESTORATION DETAILS AND NOTES

PREPARED BY:

LANDSCAPE ARCHITECT:

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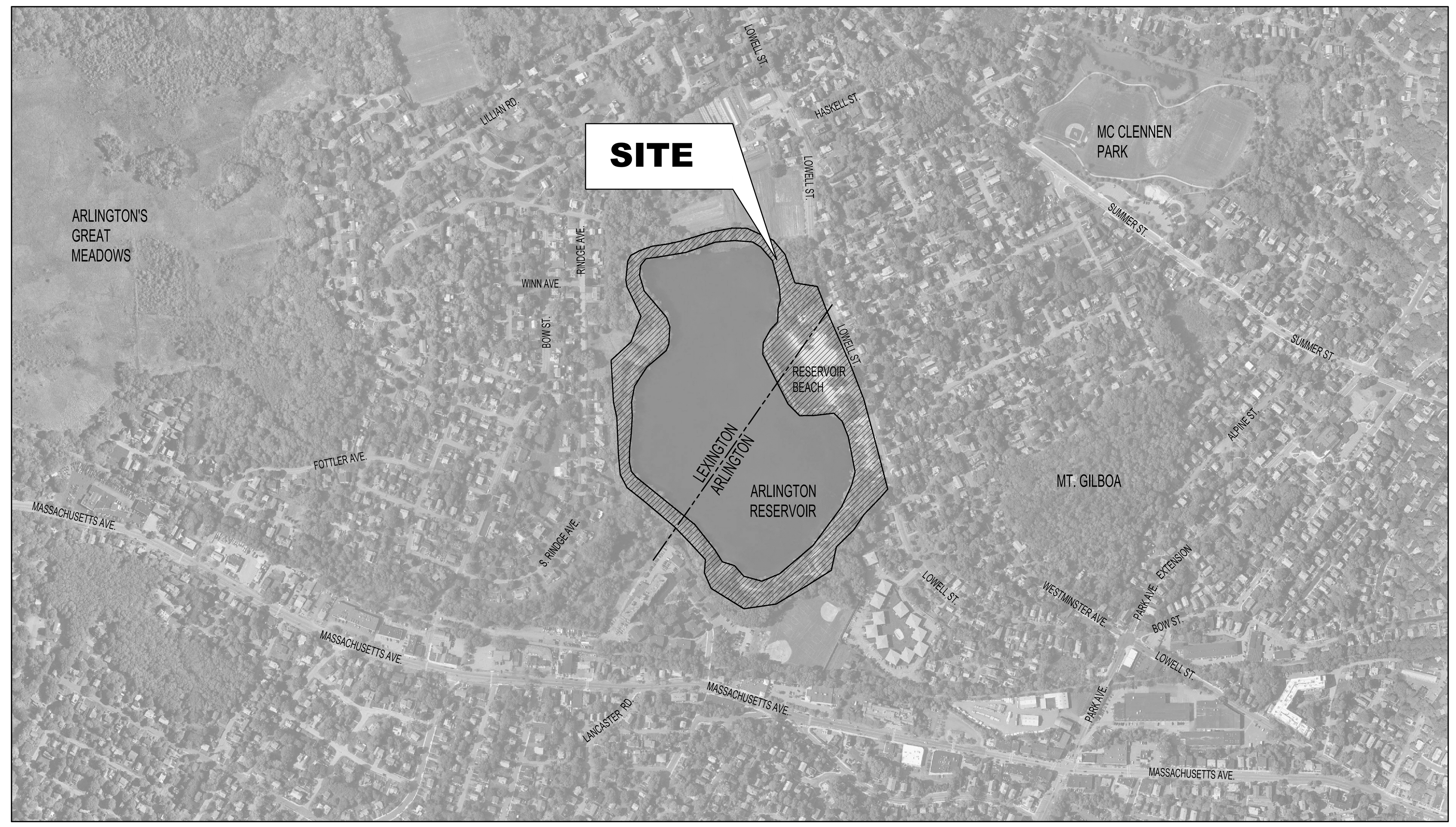
617-350-0215 Fax

CIVIL ENGINEER:

Woodard & Curran, Inc.
980 Washington Street #325, Dedham, MA 02026
800-446-5518 Tel

ENVIRONMENTAL CONSULTING:

SWCA Environmental Consultants
15 Research Drive, Amherst, MA 01002
413-575-9883 Tel



LOCATION MAP
Lowell Street/Arlington Reservoir
Arlington, MA

500 0 500 1000 FT

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO.	REVISION	DATE

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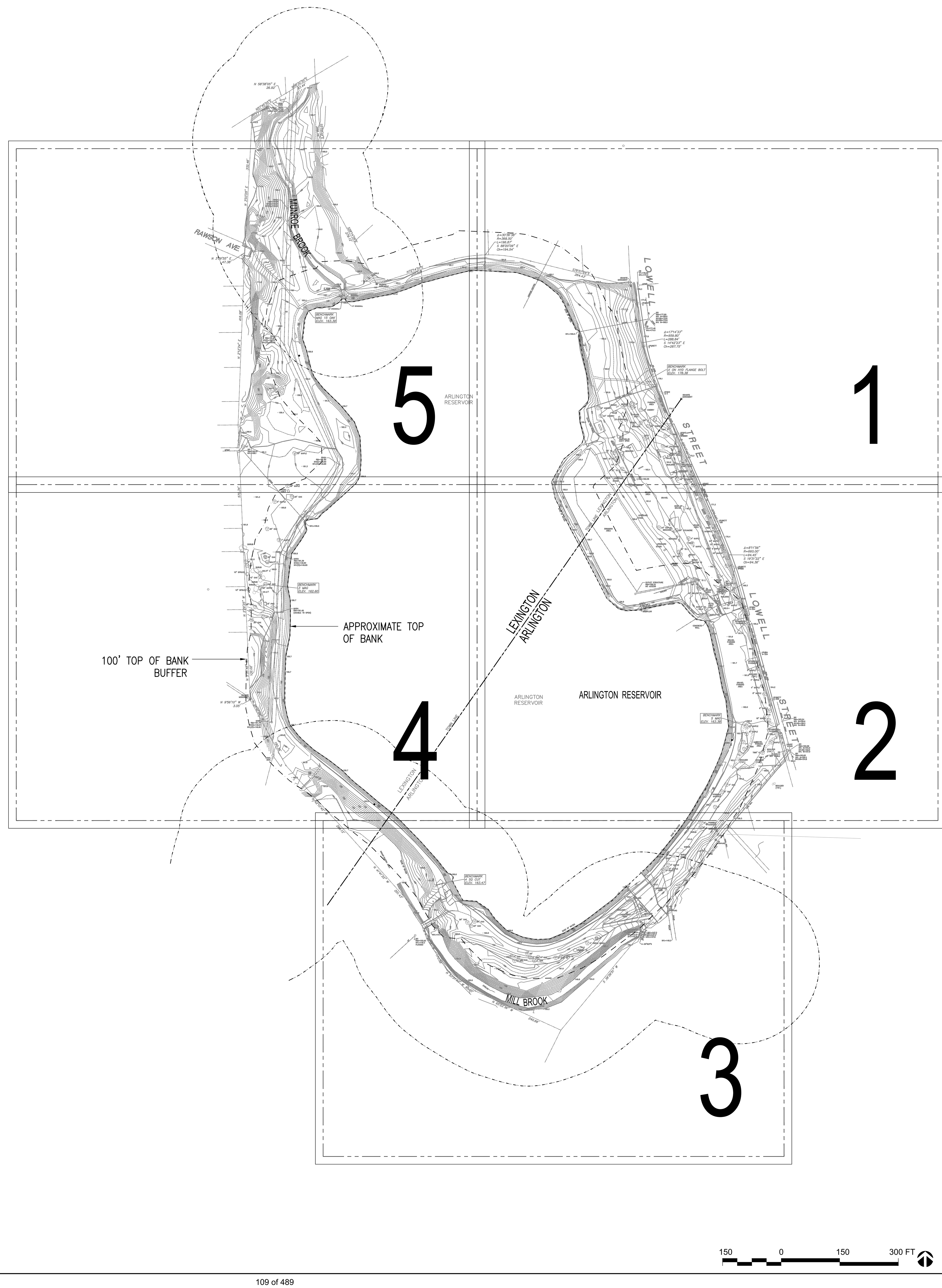
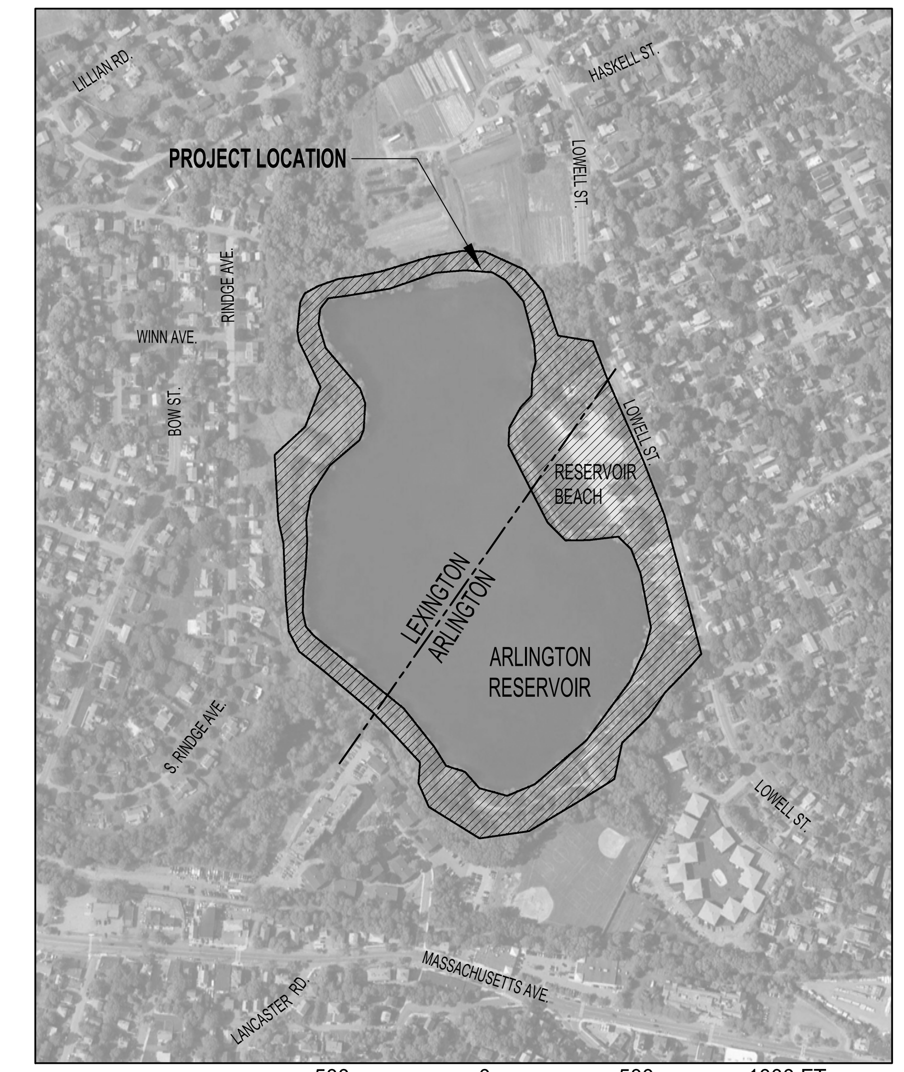
Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB Checked By: KZ
Date: NOVEMBER 13, 2020
Scale: N/A
Drawing Title:

COVER SHEET

G





LOCUS MAP 500 0 500 1000 FT

GENERAL NOTES:

1. CONTRACTOR SHALL BE FAMILIAR WITH DRAWINGS AND SPECIFICATIONS BEFORE BIDDING
2. DRAWINGS SHALL SUPERSEDE SPECIFICATIONS FOR ANY DISCREPANCIES
3. CONTRACTOR SHALL CONFORM TO ALL FEDERAL, STATE AND LOCAL CODES, INCLUDING CMR521/ADA.
4. NO SMOKING IS ALLOWED WITHIN THE PARK AT ANY TIME
5. SURVEY WAS PERFORMED BY WESTON & SAMPSON ENGINEERS, INC. OF ALBANY, NY WAS UNDERTAKEN IN DECEMBER 2017
6. PER THE STORMWATER POLLUTION PREVENTION PLAN (DATED 11/9/2020), THE CONTRACTOR CAN NOT DISTURB MORE THAN 5 ACRES AT ANY GIVEN TIME.

LEGEND

APPROXIMATE TOP OF BANK

100' TOP OF BANK BUFFER

200' RIVERFRONT AREA

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO.	REVISION	DATE

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100% DESIGN DEVELOPMENT SET

Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB Checked By: KZ
Date: NOVEMBER 13, 2020
Scale: AS SHOWN
Drawing Title:

KEY PLAN

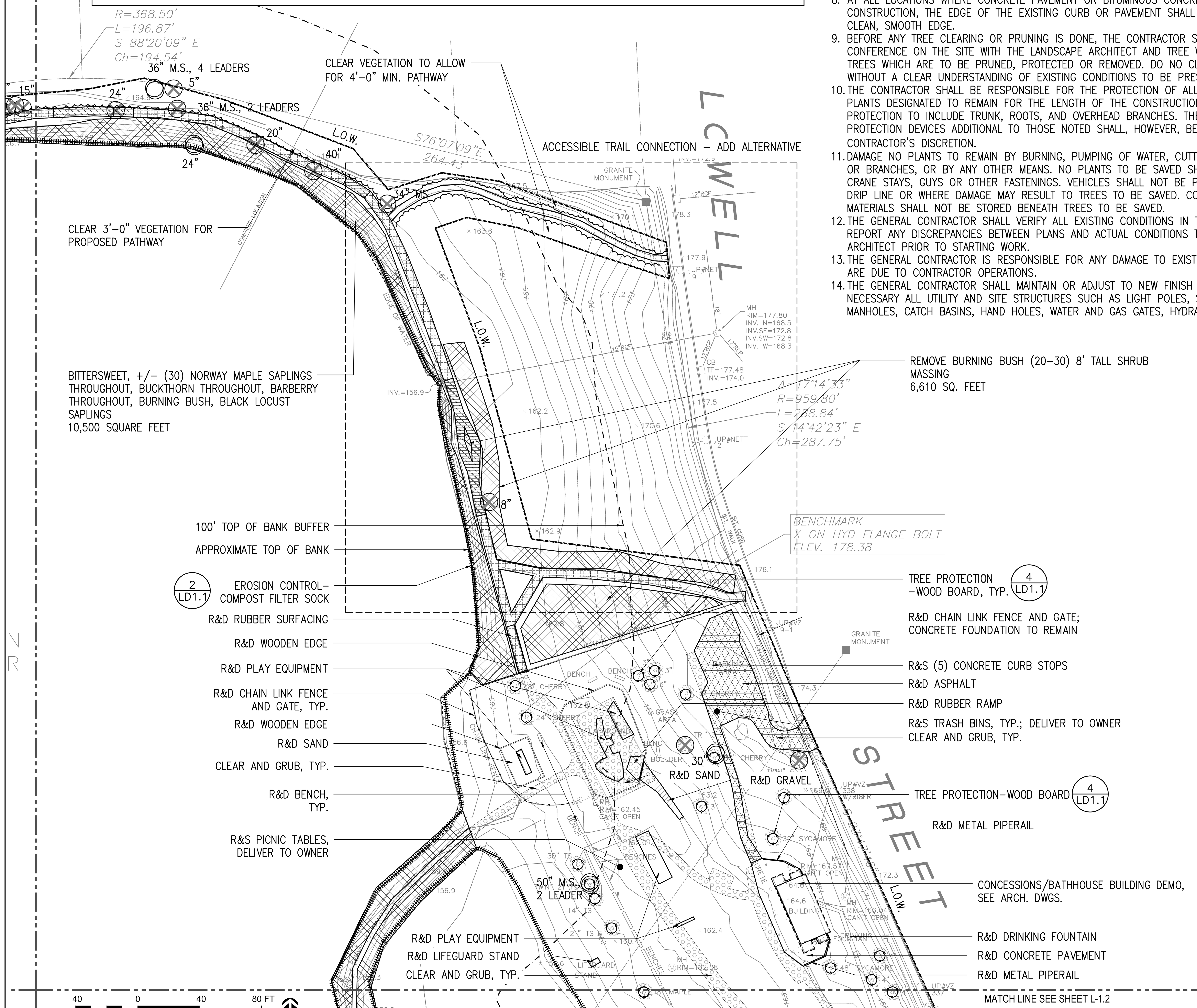
L0

MATCH LINE SEE SHEET L-1.5

LEGEND

Symbol	Description	Symbol	Description	Symbol	Description
L.O.W.	LIMIT OF WORK	24"	REMOVE TREE OR SHRUB, TYP. (SIZE, DBH)		REMOVE AND DISPOSE 10" OF STONE DUST AND GRAVEL BASE
	CONSTRUCTION FENCE	24"	REMOVE INVASIVE TREE OR SHRUB (SIZE, DBH)		REMOVE AND DISPOSE ASPHALT, TYP.
1 / LD1.1	TREE PROTECTION -FENCING, TYP.	24"	PRUNE TREE, (SIZE, DBH)		REMOVE AND DISPOSE GRAVEL, TYP.
4 / LD1.1	TREE PROTECTION -WOOD BOARD, TYP.	R&D	REMOVE AND DISPOSE		STRIP AND STOCKPILE LOAM, TYP.
2 / LD1.1	EROSION CONTROL -COMPOST SOCK, TYP.	R&S	REMOVE AND STOCKPILE		CLEAR AND GRUB, TYP.
	SAWCUT LINE, TYP.	R&R	REMOVE AND RESET		AIRSPADE EXISTING PATH, TYP.
3 / LD1.1	SILT SACK INLET PROTECTION				EXCAVATE 9" OF EX. PATH, TYP. OR FOR PROPOSED PATH, TYP.
	LIGHT POST TO REMAIN AND BE PROTECTED, TYP.				SCARIFY STONEDUST PATH, TYP.
	INVASIVE MANAGEMENT AREA				
	GRANITE MILE MARKER				
	APPROXIMATE TOP OF BANK				
	100' TOP OF BANK BUFFER		200' RIVERFRONT AREA		

NOTE:
1. PROTECT STOCKPILED MATERIALS DURING CONSTRUCTION
2. ALL GRANITE BENCHES TO BE R&S FOR REUSE ON SITE; ALL GRANITE MILE MAKERS TO BE R&R
3. ALL WOOD SIGN POSTS, UNLESS OTHERWISE DESIGNATED, TO BE R&R



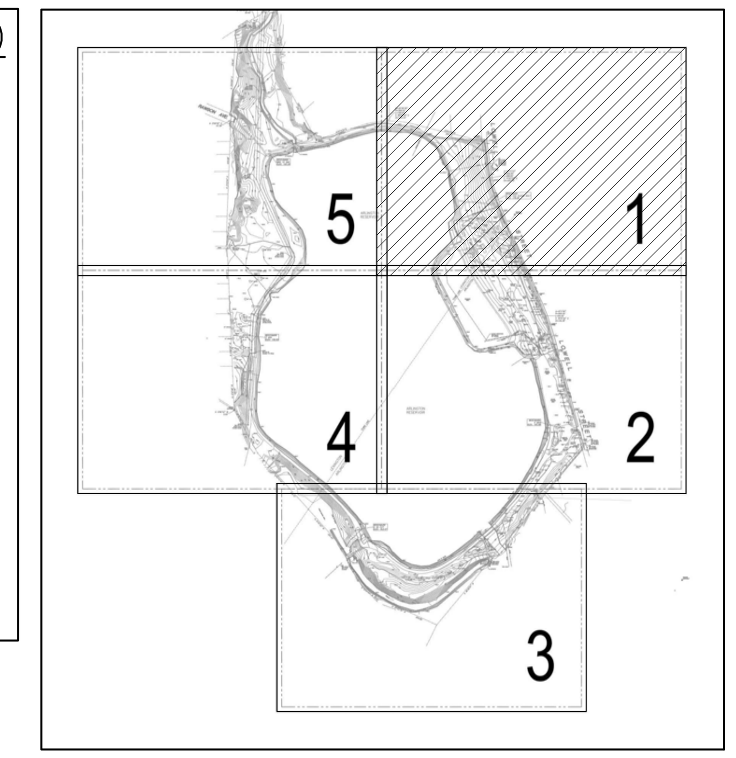
SITE PREPARATION AND DEMOLITION NOTES:

1. PRIOR TO COMMENCING ANY EXCAVATION WORK, THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES IN ACCORDANCE WITH THE "DIG SAFE" NOTIFICATION PROCEDURES PROMOTED BY RESPECTIVE UTILITY COMPANIES. THE DIG SAFE TELEPHONE NUMBER FOR MASSACHUSETTS IS 811.
2. PRIOR TO COMMENCING EARTHWORK, EROSION & SEDIMENTATION CONTROLS MUST BE IN PLACE, INCLUDING BUT NOT LIMITED TO COMPOST SOCKS AND SILT SACKS.
3. THE LOCATIONS OF ALL UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE DIAGRAMMATIC ONLY. THE CONTRACTOR SHALL CONTACT THE PROPER LOCAL AUTHORITIES OR RESPECTIVE UTILITY COMPANY TO CONFIRM THE LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. ANY DAMAGE DUE TO FAILURE OF THE CONTRACTOR TO CONTACT THE PROPER AUTHORITIES SHALL BE BORNE BY THE CONTRACTOR.
4. ALL REFUSE, DEBRIS, AND MISCELLANEOUS ITEMS TO BE REMOVED, THAT ARE NOT TO BE STOCKPILED FOR LATER USE ON THE PROJECT OR DELIVERED TO THE OWNER, SHALL BE LEGALLY DISPOSED OF OFF-SITE BY THE CONTRACTOR.
5. ALL ITEMS REQUIRING REMOVAL SHALL BE REMOVED TO FULL DEPTH TO INCLUDE BASE MATERIAL AND FOOTINGS OR FOUNDATIONS AS APPLICABLE, AND REUSED AS DIRECTED BY THE OWNER OR LEGALLY DISPOSED OF OFF-SITE BY CONTRACTOR.
6. CONTRACTOR SHALL STRIP AND STOCKPILE EXISTING TOPSOIL TO FULL DEPTH WITHIN LIMIT OF GRADING BEFORE COMMENCING EXCAVATION AND GRADING OPERATIONS. TOPSOIL SHALL NOT BE REMOVED FROM THE SITE, UNLESS APPROVED BY THE LANDSCAPE ARCHITECT.
7. ALL MATERIALS THAT ARE TO BE STORED & STOCKPILED ON SITE THAT ARE LOOSE AND MAY WASH WITH RAIN EVENTS, ARE TO BE COVERED WITH A TARP AND/OR SURROUNDED WITH EROSION &SEDIMENT CONTROLS.
8. AT ALL LOCATIONS WHERE CONCRETE PAVEMENT OR BITUMINOUS CONCRETE ABUT NEW CONSTRUCTION, THE EDGE OF THE EXISTING CURB OR PAVEMENT SHALL BE SAWCUT TO A CLEAN, SMOOTH EDGE.
9. BEFORE ANY TREE CLEARING OR PRUNING IS DONE, THE CONTRACTOR SHALL ARRANGE A CONFERENCE ON THE SITE WITH THE LANDSCAPE ARCHITECT AND TREE WARDEN TO IDENTIFY TREES WHICH ARE TO BE PRUNED, PROTECTED OR REMOVED. DO NO CLEARING OR PRUNING WITHOUT A CLEAR UNDERSTANDING OF EXISTING CONDITIONS TO BE PRESERVED.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING TREES AND PLANTS DESIGNATED TO REMAIN FOR THE LENGTH OF THE CONSTRUCTION PERIOD. PROTECTION TO INCLUDE TRUNK, ROOTS, AND OVERHEAD BRANCHES. THE PLACEMENT OF PROTECTION DEVICES ADDITIONAL TO THOSE NOTED SHALL, HOWEVER, BE AT THE CONTRACTOR'S DISCRETION.
11. DAMAGE NO PLANTS TO REMAIN BY BURNING, PUMPING OF WATER, CUTTING OF LIVE ROOTS OR BRANCHES, OR BY ANY OTHER MEANS. NO PLANTS TO BE SAVED SHALL BE USED FOR CRANE STAYS, GUYS OR OTHER FASTENINGS. VEHICLES SHALL NOT BE PARKED WITHIN THE DRIP LINE OR WHERE DAMAGE MAY RESULT TO TREES TO BE SAVED. CONSTRUCTION MATERIALS SHALL NOT BE STORED BENEATH TREES TO BE SAVED.
12. THE GENERAL CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS IN THE FIELD AND REPORT ANY DISCREPANCIES BETWEEN PLANS AND ACTUAL CONDITIONS TO THE LANDSCAPE ARCHITECT PRIOR TO STARTING WORK.
13. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING CONDITIONS THAT ARE DUE TO CONTRACTOR OPERATIONS.
14. THE GENERAL CONTRACTOR SHALL MAINTAIN OR ADJUST TO NEW FINISH GRADE AS NECESSARY ALL UTILITY AND SITE STRUCTURES SUCH AS LIGHT POLES, SIGN POLES, MANHOLES, CATCH BASINS, HAND HOLES, WATER AND GAS GATES, HYDRANTS, ETC., FROM MAINTAINED UTILITY AND SITE SYSTEMS UNLESS OTHERWISE NOTED ON THE UTILITY DRAWINGS OR AS DIRECTED BY THE LANDSCAPE ARCHITECT.
15. THE GENERAL CONTRACTOR SHALL COORDINATE ALL ADJUSTMENT OR ABANDONMENT OF UTILITIES WITH THE RESPECTIVE UTILITY COMPANY.
16. ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS SHALL BE PROTECTED TO PREVENT TRACKING OF MUD ONTO PUBLIC WAYS. ANY MUD ON PUBLIC WAYS ORIGINATING FROM THE JOB SITE SHALL BE CLEANED BY THE CONTRACTOR.
17. CONTRACTOR SHALL SECURE ALL PERMITS THAT MAY BE REQUIRED FROM ALL JURISDICTIONS AFFECTED BY THIS WORK.
18. CONTRACTOR'S EQUIPMENT AND VEHICLES SHALL BE PARKED ON PAVED SURFACES ONLY. NO PARKING ON TURF OR SAND AREAS.
19. CONTRACTOR CAN REQUEST TO UTILIZE ADDITIONAL STAGING AREAS WITHIN THE LIMIT OF WORK. ALL STAGING AREAS, AS SHOWN ON THE PLANS OR ADDITIONAL AREAS REQUESTED BY THE CONTRACTOR, SHALL PROVIDE PROTECTION OF THE GROUND PER THE SPECIFICATIONS. NO ADDITIONAL COST CAN BE REQUESTED FOR ADDITIONAL STAGING AREAS.
20. WITHIN THE LIMIT OF WORK, CONTRACTOR SHALL IDENTIFY ALL TREE LIMBS LOWER THAN 10' ABOVE THE GROUND SURFACE THAT MAY BE VULNERABLE TO EQUIPMENT DAMAGE. NOTIFY THE LANDSCAPE ARCHITECT PRIOR TO STARTING WORK BENEATH ANY OF THESE LIMBS. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO TREE LIMBS THAT ARE DUE TO CONTRACTOR OPERATIONS.
21. CONTRACTOR TO CLEAN ALL DRAINAGE STRUCTURES WITHIN LIMIT OF WORK BEFORE SITE WORK BEGINS, AND AT THE END OF THE PROJECT. CONTRACTOR TO PROVIDE SILT SACKS FOR ALL CATCH BASINS WITHIN LIMIT OF WORK. CONTRACTOR TO CLEAN ALL DRAINAGE PIPES CONNECTED TO ALL CATCH BASINS THAT ARE WITHIN THE LIMIT OF WORK.

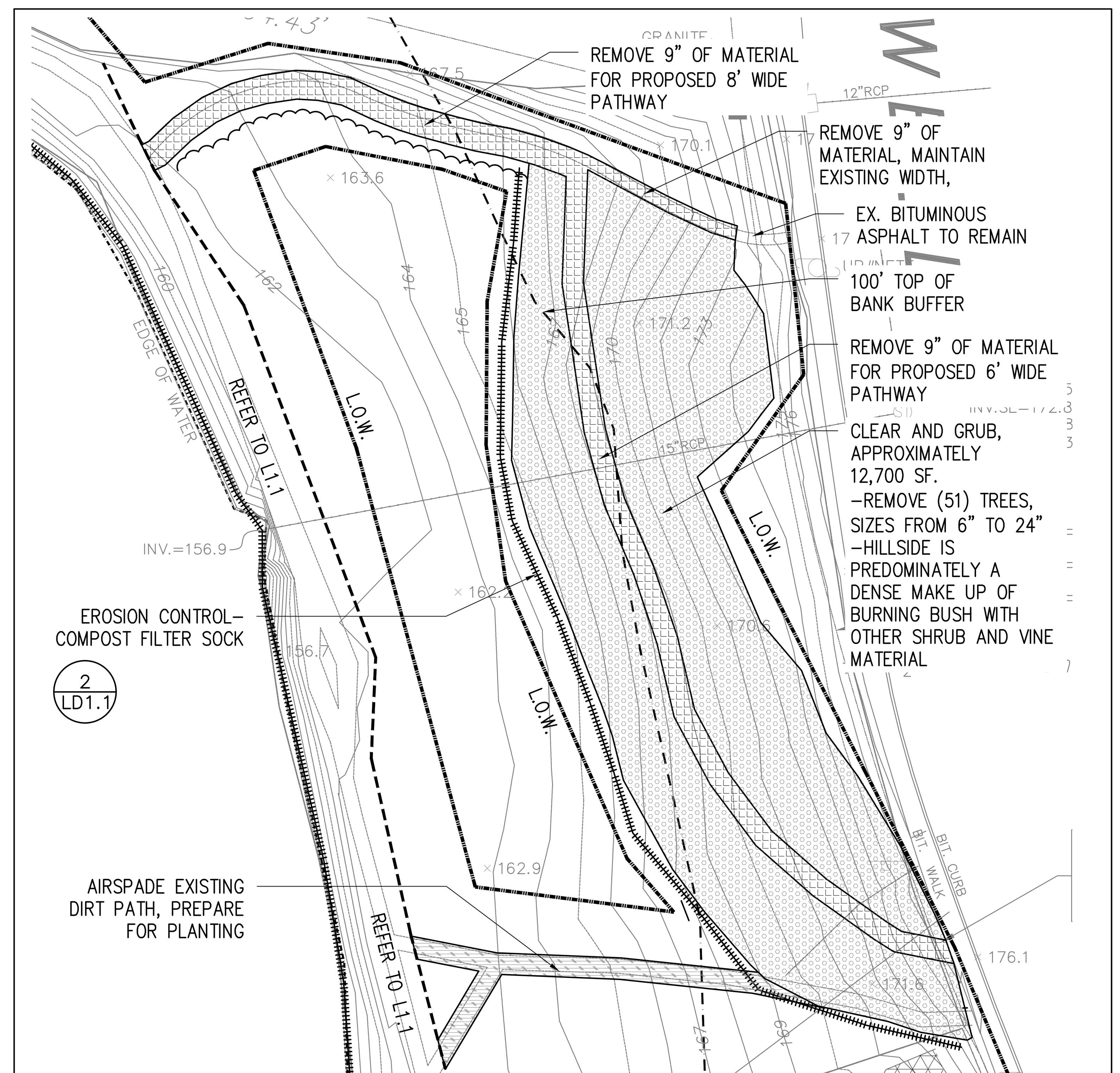
ARLINGTON TREE REMOVAL AND REPLACEMENT POLICY:

1. REMOVAL OF A 3-8" DBH TREE SHALL BE REPLACED WITH (1) TREE
2. REMOVAL OF A 9-20" DBH TREE SHALL BE REPLACED WITH (2) TREES
3. REMOVAL OF A 21"+ DBH TREE SHALL BE REPLACED WITH (3) TREES
4. TOTAL PROPOSED TREES TO REMOVE:

3-8"	=	11 TREES
9-20"	=	9 TREES
21"+	=	5 TREES
TOTAL	=	44 TREES



KEY PLAN



ACCESSIBLE TRAIL CONNECTION - ADD ALTERNATIVE
SCALE: 1" = 30'-0"

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO.	REVISION	DATE

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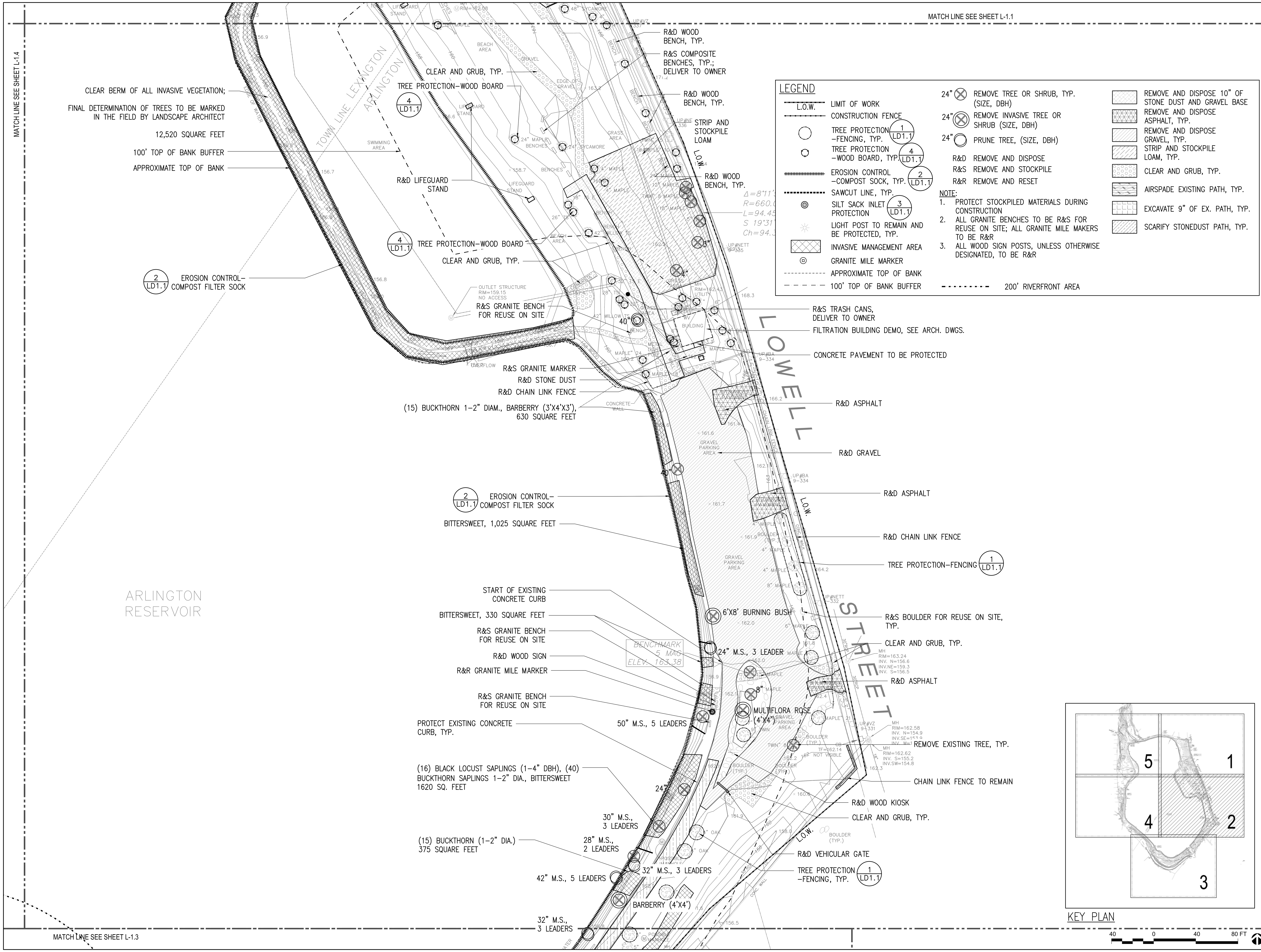
100% DESIGN DEVELOPMENT SET

Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB | Checked By: KZ
Date: NOVEMBER 13, 2020
Scale: 1"=40'-0"
Drawing Title:

SITE PREPARATION AND DEMO PLAN

L1.1



ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

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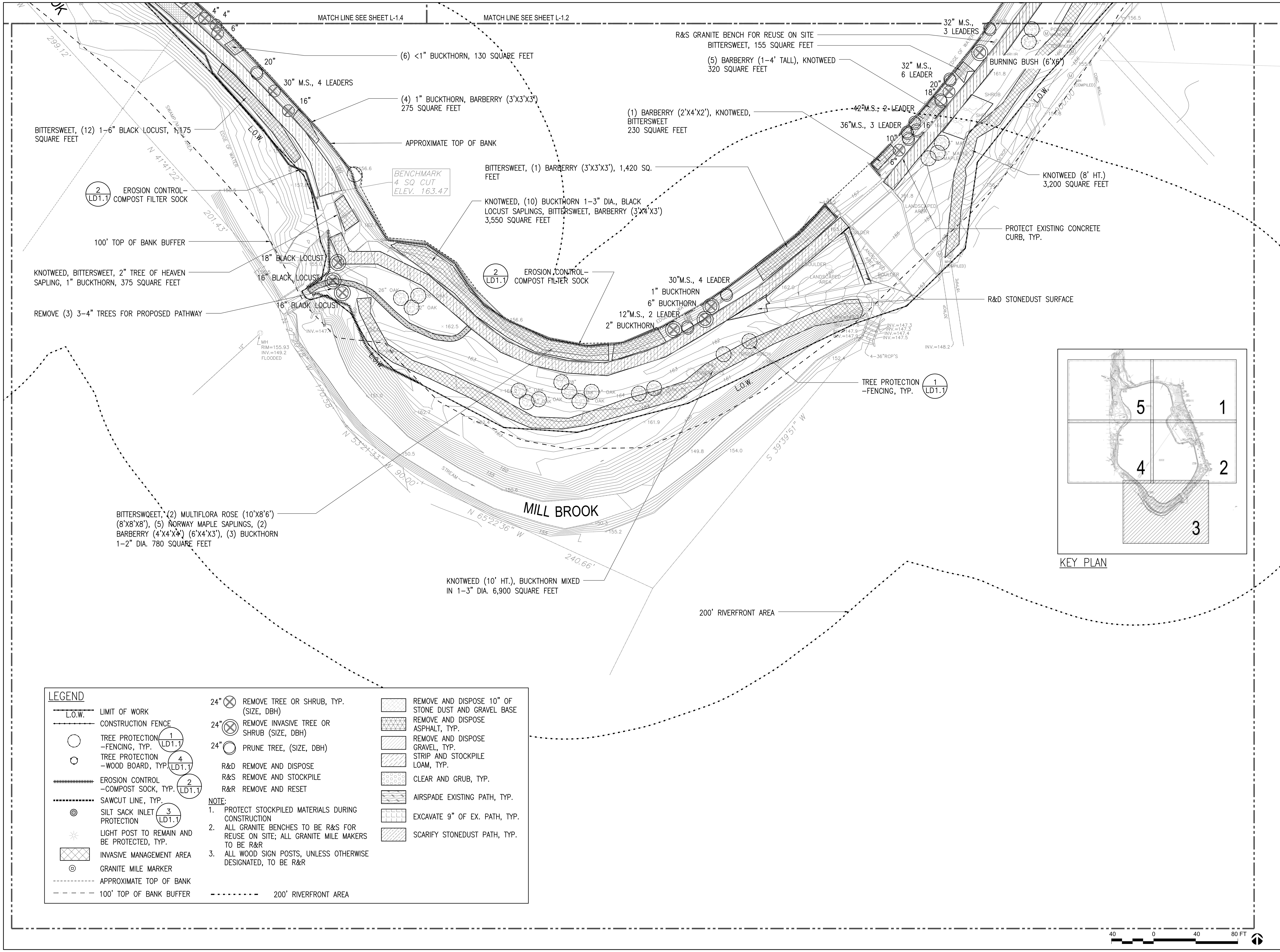
SITE PREPARATION AND DEMO PLAN

L1.2



ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

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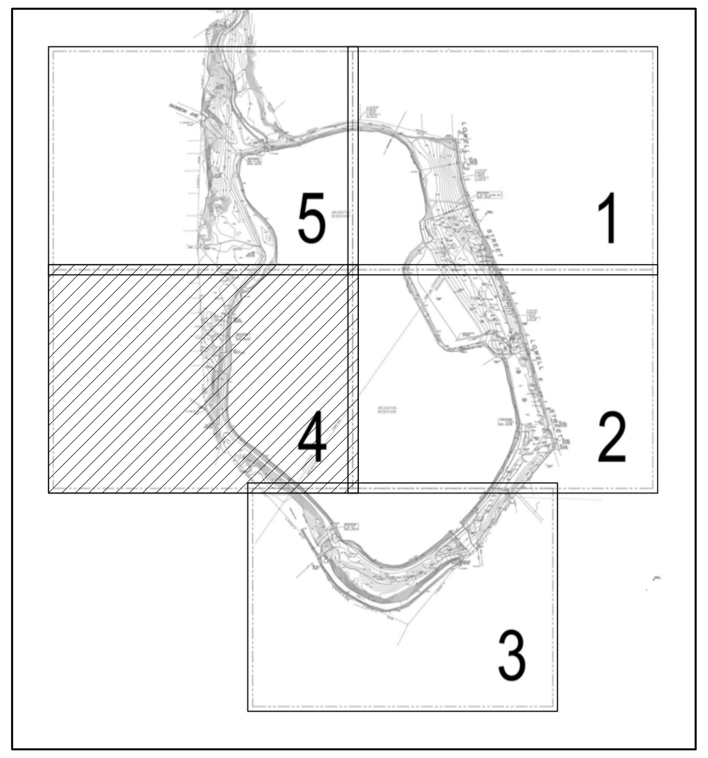
Drawing Title:

SITE PREPARATION AND DEMO PLAN

L1.3

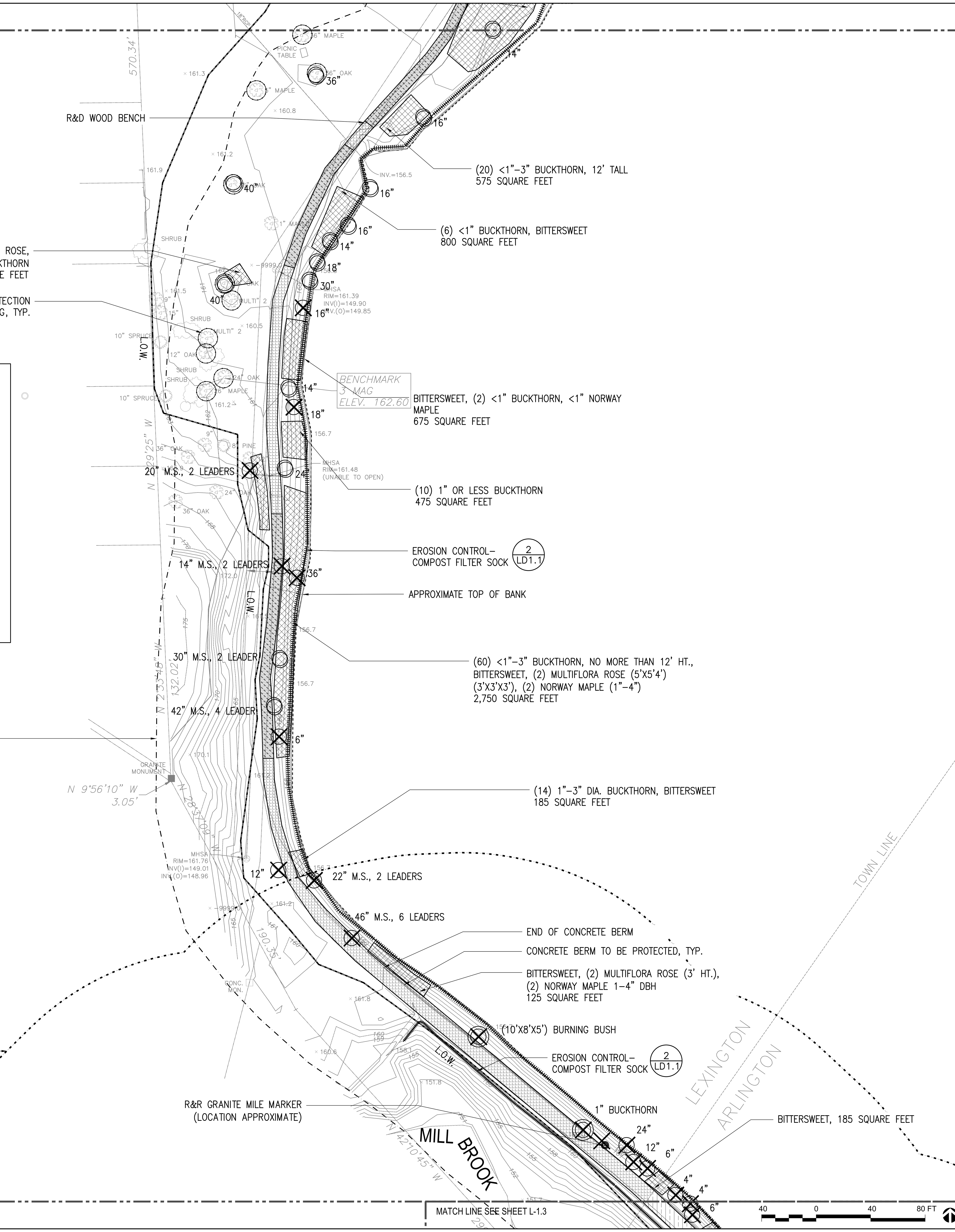


KEY PLAN

LEGEND

L.O.W.	LIMIT OF WORK
	CONSTRUCTION FENCE
	TREE PROTECTION –FENCING, TYP. (1/LD1.1)
	TREE PROTECTION –WOOD BOARD, TYP. (4/LD1.1)
	EROSION CONTROL –COMPOST SOCK, TYP. (2/LD1.1)
	SAWCUT LINE, TYP.
	SILT SACK INLET PROTECTION (3/LD1.1)
	LIGHT POST TO REMAIN AND BE PROTECTED, TYP.
	INVASIVE MANAGEMENT AREA
	GRANITE MILE MARKER
	APPROXIMATE TOP OF BANK
	100' TOP OF BANK BUFFER
24"	REMOVE TREE OR SHRUB, TYP. (SIZE, DBH)
24"	REMOVE INVASIVE TREE OR SHRUB (SIZE, DBH)
24"	PRUNE TREE, (SIZE, DBH)
R&D	REMOVE AND DISPOSE
R&S	REMOVE AND STOCKPILE
R&R	REMOVE AND RESET
	200' RIVERFRONT AREA
	REMOVE AND DISPOSE 10" OF STONE DUST AND GRAVEL BASE
	REMOVE AND DISPOSE ASPHALT, TYP.
	REMOVE AND DISPOSE GRAVEL, TYP.
	STRIP AND STOCKPILE LOAM, TYP.
	CLEAR AND GRUB, TYP.
	AIRSPADE EXISTING PATH, TYP.
	EXCAVATE 9" OF EX. PATH, TYP.
	SCARIFY STONEDUST PATH, TYP.

NOTE:
1. PROTECT STOCKPILED MATERIALS DURING CONSTRUCTION
2. ALL GRANITE BENCHES TO BE R&S FOR REUSE ON SITE; ALL GRANITE MILE MAKERS TO BE R&R
3. ALL WOOD SIGN POSTS, UNLESS OTHERWISE DESIGNATED, TO BE R&R



ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

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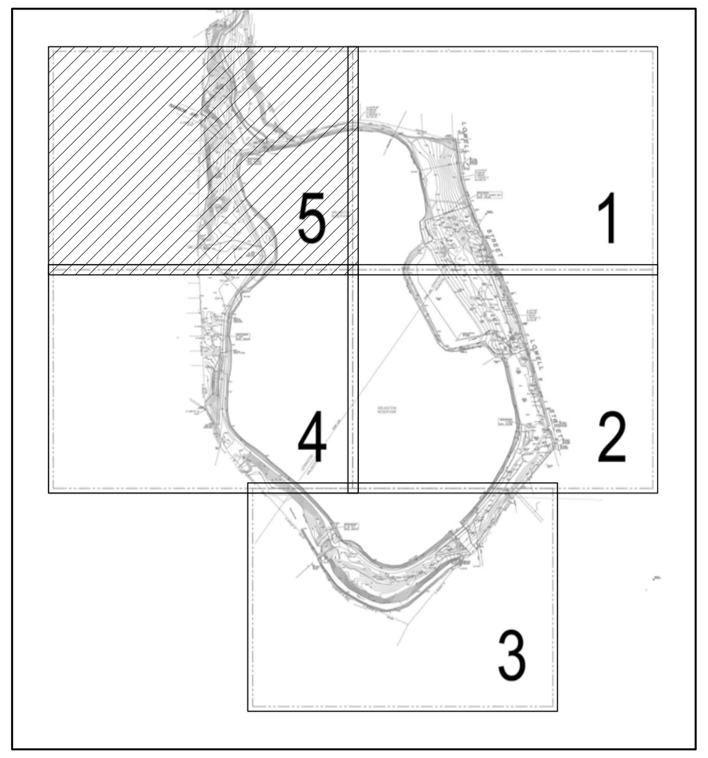
Drawing Title:

SITE PREPARATION AND DEMO PLAN

L1.4

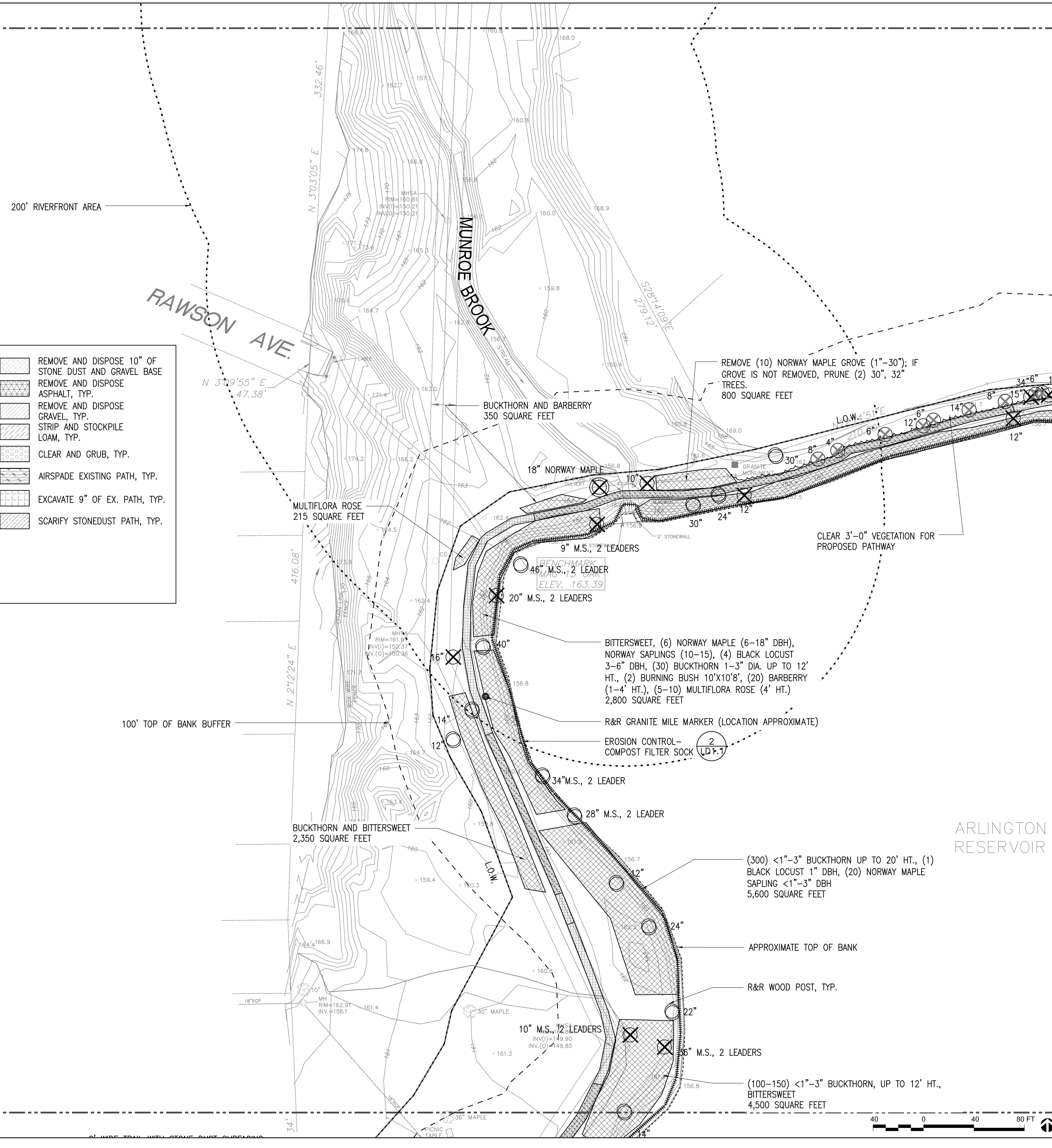


KEY PLAN

LEGEND

- L.O.W. — LIMIT OF WORK
- CONSTRUCTION FENCE
- TREE PROTECTION –FENCING, TYP. (1 / LD1.1)
- TREE PROTECTION –WOOD BOARD, TYP. (4 / LD1.1)
- EROSION CONTROL –COMPOST SOCK, TYP. (2 / LD1.1)
- SAWCUT LINE, TYP.
- SILT SACK INLET PROTECTION (3 / LD1.1)
- LIGHT POST TO REMAIN AND BE PROTECTED, TYP.
- INVASIVE MANAGEMENT AREA
- GRANITE MILE MARKER
- APPROXIMATE TOP OF BANK
- 100' TOP OF BANK BUFFER
- 24" REMOVE TREE OR SHRUB, TYP. (SIZE, DBH)
- 24" REMOVE INVASIVE TREE OR SHRUB (SIZE, DBH)
- 24" PRUNE TREE, (SIZE, DBH)
- R&D REMOVE AND DISPOSE
- R&S REMOVE AND STOCKPILE
- R&R REMOVE AND RESET
- REMOVE AND DISPOSE 10" OF STONE DUST AND GRAVEL BASE
- REMOVE AND DISPOSE ASPHALT, TYP.
- REMOVE AND DISPOSE GRAVEL, TYP.
- STRIP AND STOCKPILE LOAM, TYP.
- CLEAR AND GRUB, TYP.
- AIRSPADE EXISTING PATH, TYP.
- EXCAVATE 9" OF EX. PATH, TYP.
- SCARIFY STONEDUST PATH, TYP.
- 200' RIVERFRONT AREA

NOTE:
1. PROTECT STOCKPILED MATERIALS DURING CONSTRUCTION
2. ALL GRANITE BENCHES TO BE R&S FOR REUSE ON SITE; ALL GRANITE MILE MAKERS TO BE R&R
3. ALL WOOD SIGN POSTS, UNLESS OTHERWISE DESIGNATED, TO BE R&R



ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

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MASSACHUSETTS KYLE S. ZICK REGISTERED LANDSCAPE ARCHITECT

100% DESIGN DEVELOPMENT SET

Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB
Checked By: KZ
Date: NOVEMBER 13, 2020
Scale: 1"=40'-0"
Drawing Title:

SITE PREPARATION AND DEMO PLAN

L1.5

MATCH LINE SEE SHEET L-2.5

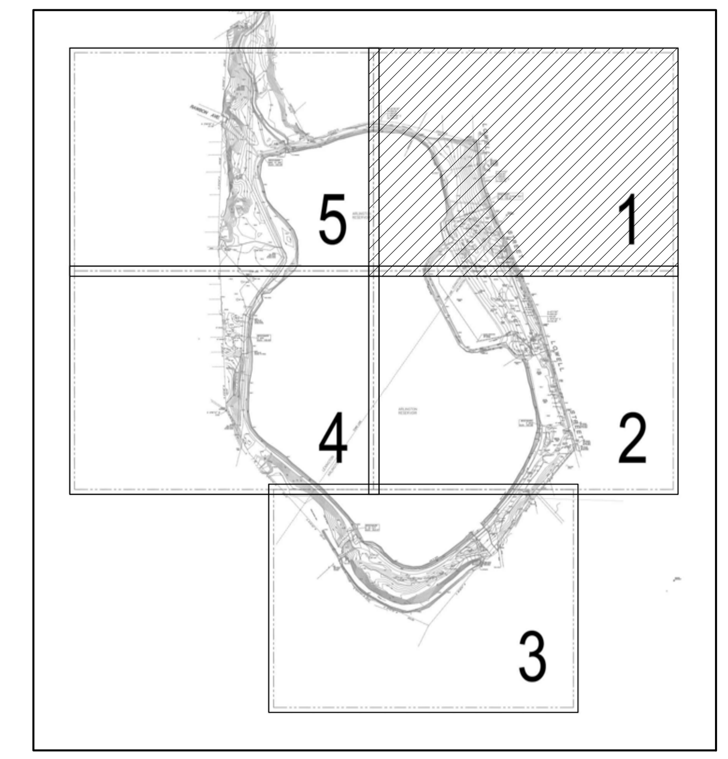
LEGEND

- L.O.W. — LIMIT OF WORK
- RESTORED EXISTING STONEDUST TRAIL
- CRUSHED GRANITE PAVEMENT, TYPE 1 (NON-STABILIZED)
- CRUSHED GRANITE PAVEMENT, TYPE 2 (STABILIZED)
- PEDESTRIAN ASPHALT
- VEHICULAR ASPHALT
- WOOD FIBER SURFACING
- POURED-IN-PLACE RUBBER SURFACING
- CONCRETE PAVEMENT
- PERMEABLE CONCRETE UNIT PAVER
- MULTI-USE COURT SURFACE
- POROUS PAVEMENT
- PICNIC TABLE
- SPLIT RAIL FENCE
- BLACK VINYL COATED CHAIN LINK FENCE
- BLACK VINYL COATED CHAIN LINK FENCE GATE
- TRASH RECEPTACLE AND RECYCLING BIN
- BIKE RACK
- 6FT LONG BENCH W/ COMPANION SPACE
- CHAIN LINK FENCE CANTILEVER GATE
- WOODEN GATE W/ GRANITE POST
- PLACED BOULDER
- WAYFINDING SIGN
- RESET GRANITE MILE MARKER
- TIMBER OVERLOOKS -TYPES 1 & 2
- ARMORED SLOPE
- TABLE AND CHAIRS
- NEW LIFE GUARD STAND WITH SHADE STRUCTURE
- HEXAGONAL BENCH
- APPROXIMATE TOP OF BANK
- 100' TOP OF BANK BUFFER
- 200' RIVERFRONT AREA

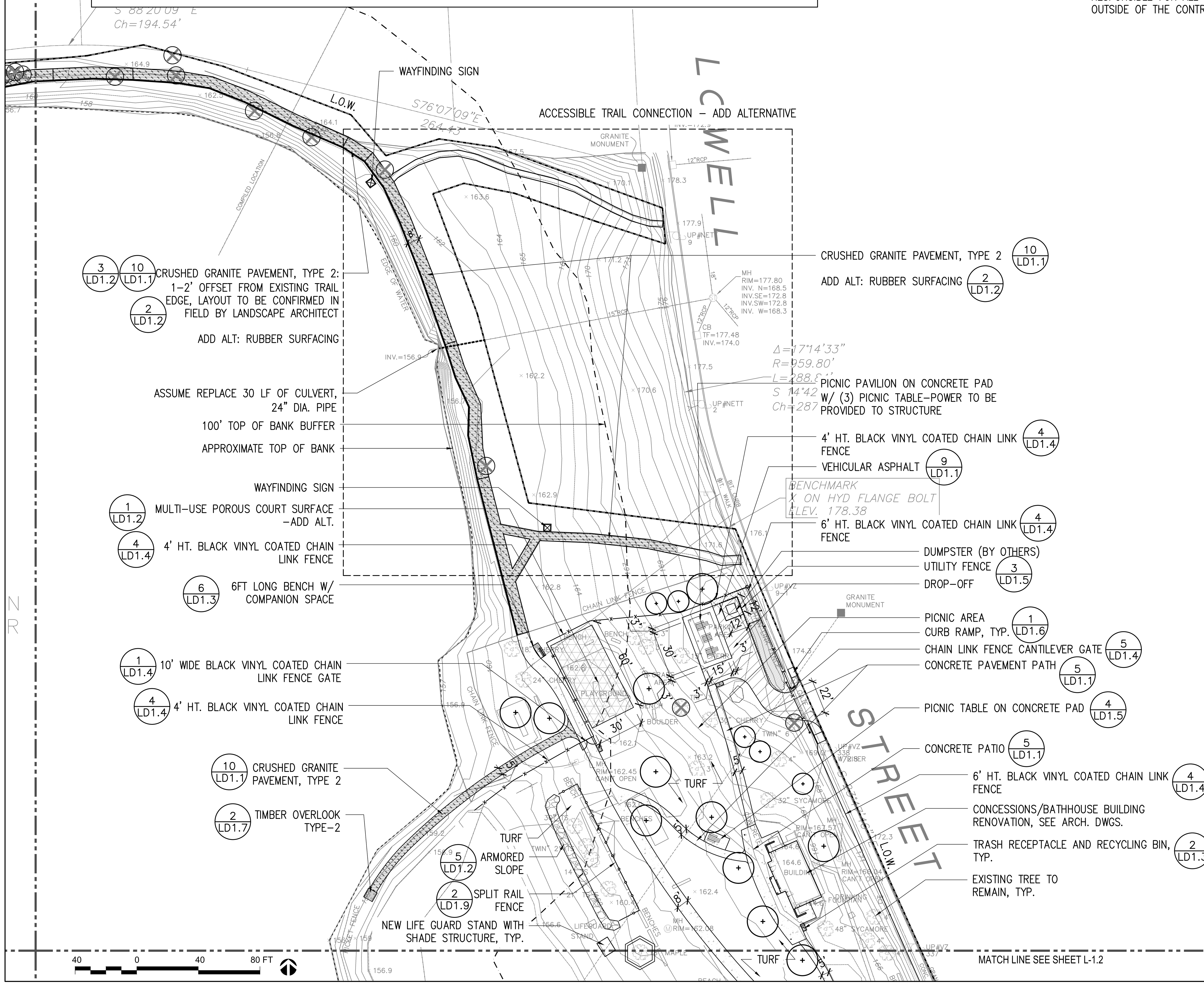
NOTE:
1. PERIMETER TRAIL BENCH LOCATIONS SHALL BE FIELD VERIFIED BY LANDSCAPE ARCHITECT PRIOR TO INSTALLATION

LAYOUT NOTES:

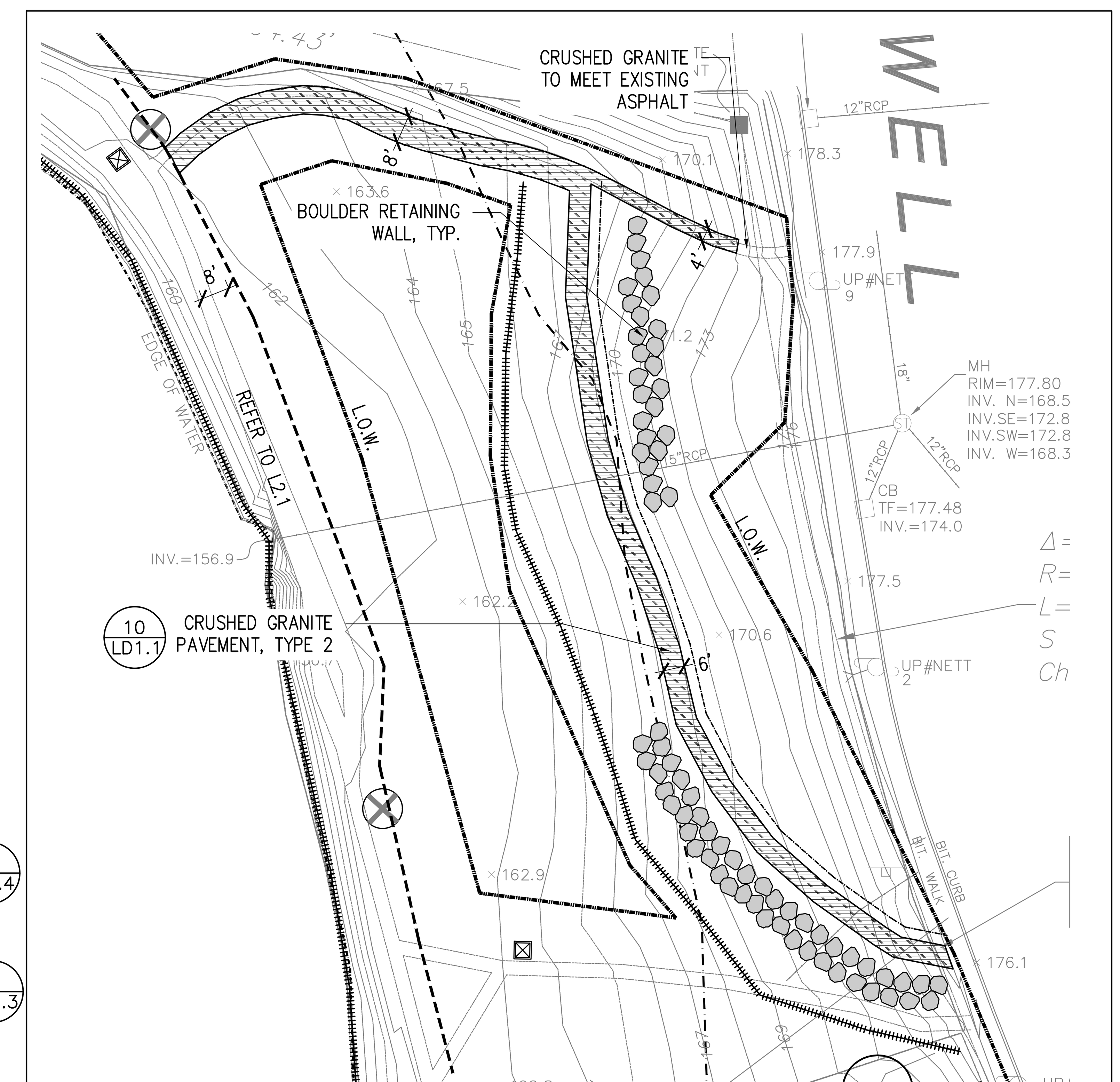
1. ALL LINE AND GRADE WORK PER DRAWINGS AND SPECIFICATIONS SHALL BE LAID OUT BY A REGISTERED CIVIL ENGINEER OR SURVEYOR ENGAGED BY THE CONTRACTOR.
2. ALL LINES AND DIMENSIONS ARE PARALLEL OR PERPENDICULAR TO THE LINES FROM WHICH THEY ARE MEASURED UNLESS OTHERWISE INDICATED.
3. STORAGE AREAS FOR CONTRACTOR'S EQUIPMENT AND MATERIALS SHALL BE IN AND WITHIN THE MATERIALS AND STORAGE AREA AS SHOWN ON PLANS AND AS APPROVED BY THE LANDSCAPE ARCHITECT.
4. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS IN THE FIELD AND REPORT ANY DISCREPANCIES IN THE SITE SURVEY TO THE LANDSCAPE ARCHITECT PRIOR TO STARTING WORK.
5. ALL LAYOUTS FOR WALKS AND PATHS SHALL BE ADEQUATELY STAKED BY THE CONTRACTOR AND APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION.
6. THE CONTRACTOR SHALL ESTABLISH PERMANENT CONSTRUCTION BENCH MARKS. MAINTAIN ALL ESTABLISHED BOUNDS AND BENCH MARKS AND REPLACE AS DIRECTED ANY WHICH ARE DESTROYED OR DISTURBED.
7. CONTRACTOR SHALL COORDINATE LOCATION OF ALL UTILITIES (LINES, DUCTS, CONDUITS, SLEEVES, FOOTINGS, ETC.) WITH LOCATIONS OF PROPOSED LANDSCAPE ELEMENTS (WALLS, FENCE, FOOTINGS, TREE ROOTBALLS, PROPOSED LIGHTING FOOTINGS, ETC.). CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT PRIOR TO CONTINUING WORK.
8. LIMIT OF WORK LINE IS NOTED ON DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGE DUE TO OPERATIONS INSIDE AND OUTSIDE OF THE CONTRACT LIMIT LINE. ANY AREA OUTSIDE THE LIMIT OF WORK THAT ARE DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO ADDITIONAL COST TO THE OWNER.
9. PROVIDE EXPANSION JOINTS AT ALL CURBS, WALLS, STEPS, LIGHT POLE BASES, PULL BOXES, MANHOLES, ETC. AND AS SHOWN ON PLAN.
10. LOAM AND SEED ALL DISTURBED AREAS THAT ARE NOT PROPOSED AS PAVEMENT UNLESS OTHERWISE INDICATED ON PLANS.
11. WITHIN THE LIMIT OF WORK, CONTRACTOR SHALL IDENTIFY ALL TREE LIMBS LOWER THAN 10' ABOVE THE GROUND SURFACE THAT MAY BE VULNERABLE TO EQUIPMENT DAMAGE. NOTIFY THE LANDSCAPE ARCHITECT PRIOR TO STARTING WORK BENEATH ANY OF THESE LIMBS. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO TREE LIMBS DUE TO CONTRACTOR OPERATIONS.
12. ALL SITE AMENITIES PAVEMENT MARKINGS AND SIGNS TO BE FIELD LOCATED AND APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.



KEY PLAN



MATCH LINE SEE SHEET L-1.2



ACCESSIBLE TRAIL CONNECTION - ADD ALTERNATIVE
SCALE: 1" = 30'-0"

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO.	REVISION	DATE

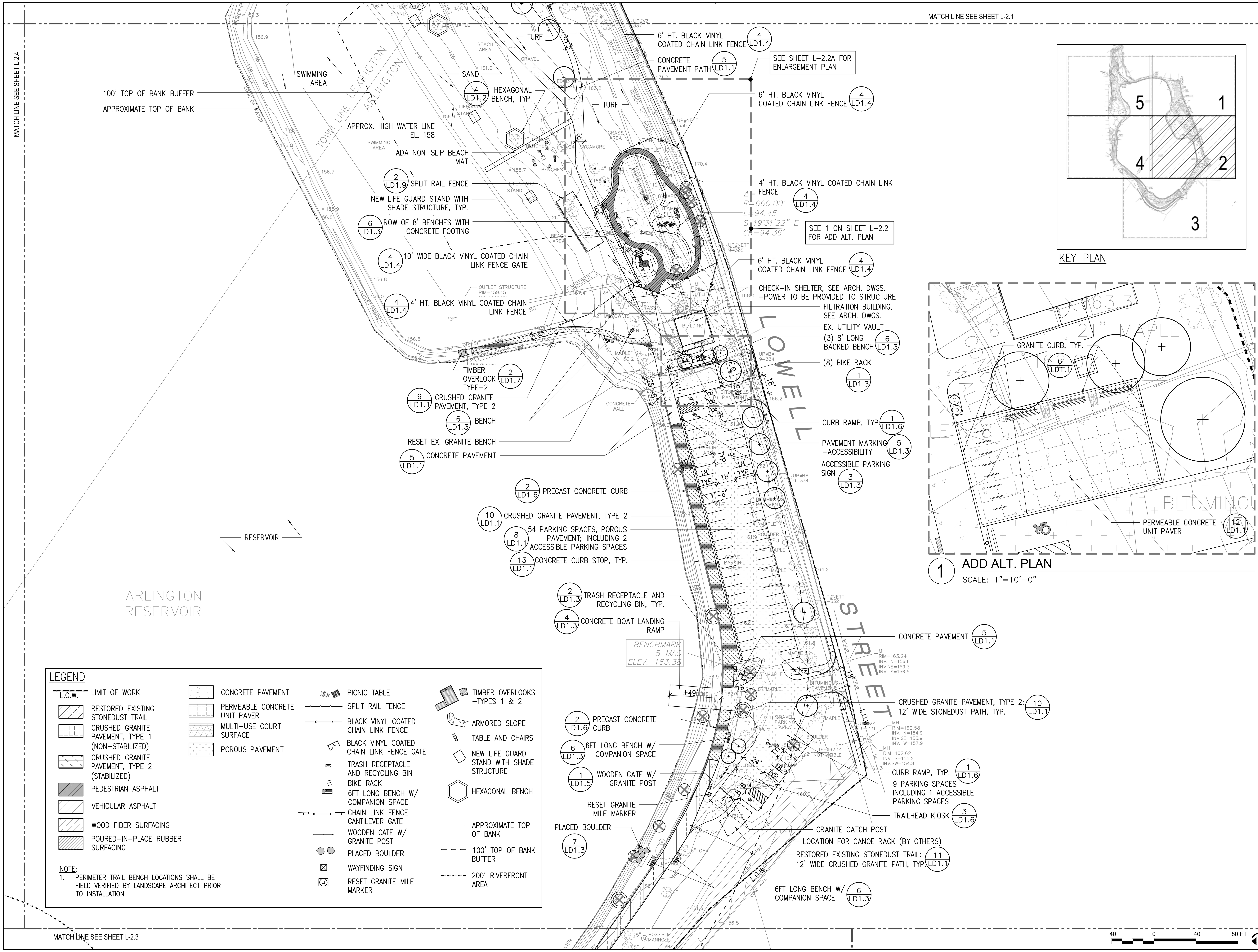
kzla
Kyle Zick Landscape Architecture, Inc.
36 Bromfield Street Suite 202
Boston, MA 02108
617 451-1018 Tel
www.kylezick.com

100% DESIGN DEVELOPMENT SET

Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB | Checked By: KZ
Date: NOVEMBER 13, 2020
Scale: 1"=40'-0"
Drawing Title:

LAYOUT AND MATERIAL PLAN

L2.1



ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO.	REVISION	DATE

kzla
Kyle Zick Landscape Architecture, Inc.
36 Bromfield Street Suite 202
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617 451-1018 Tel
www.kylezick.com

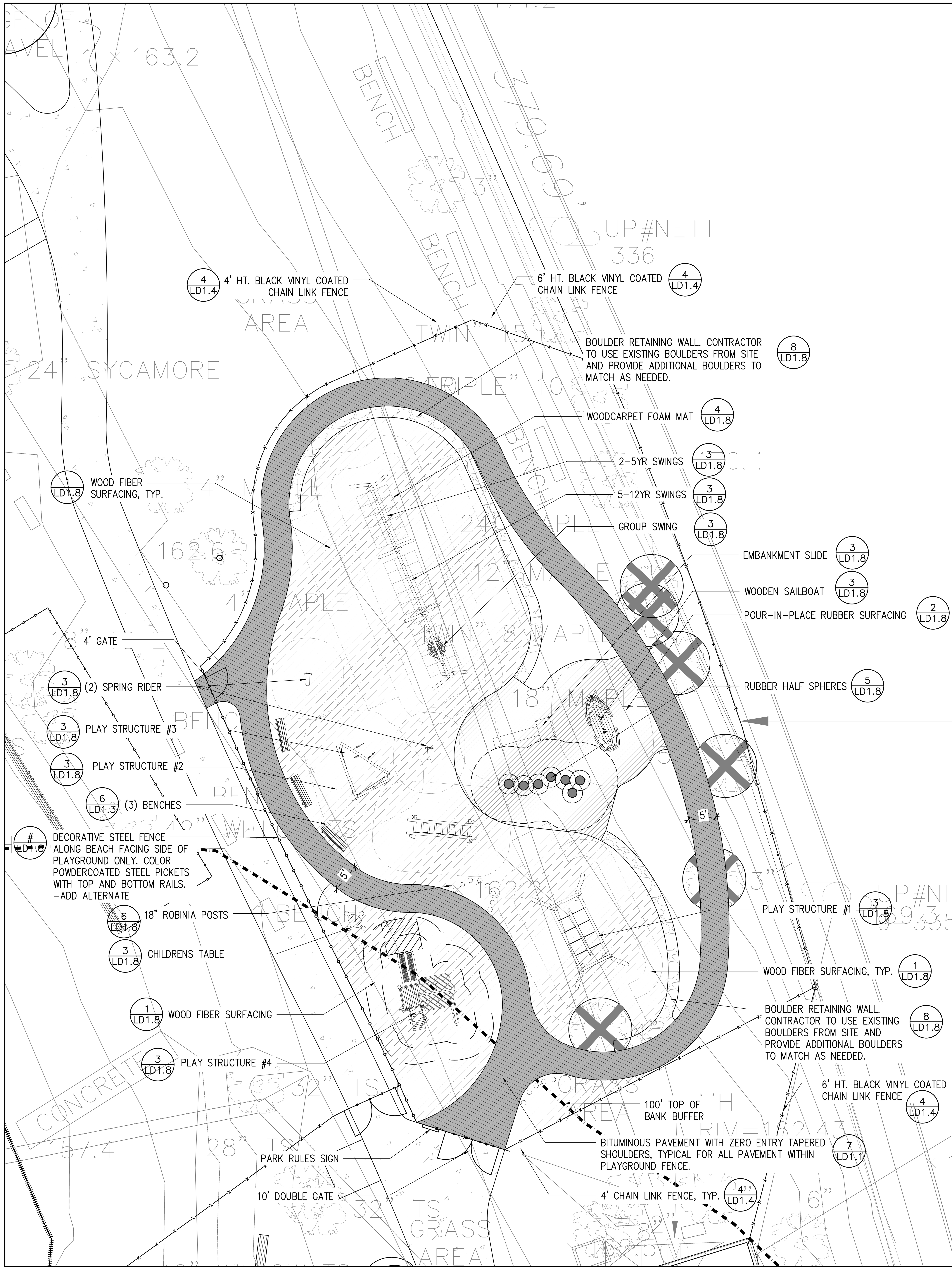
COMMONWEALTH OF MASSACHUSETTS, KYLE S. ZICK, REGISTERED LANDSCAPE ARCHITECT

100% DESIGN DEVELOPMENT SET

Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB
Checked By: KZ
Date: NOVEMBER 13, 2020
Scale: 1"=40'-0"
Drawing Title:

LAYOUT AND MATERIAL PLAN

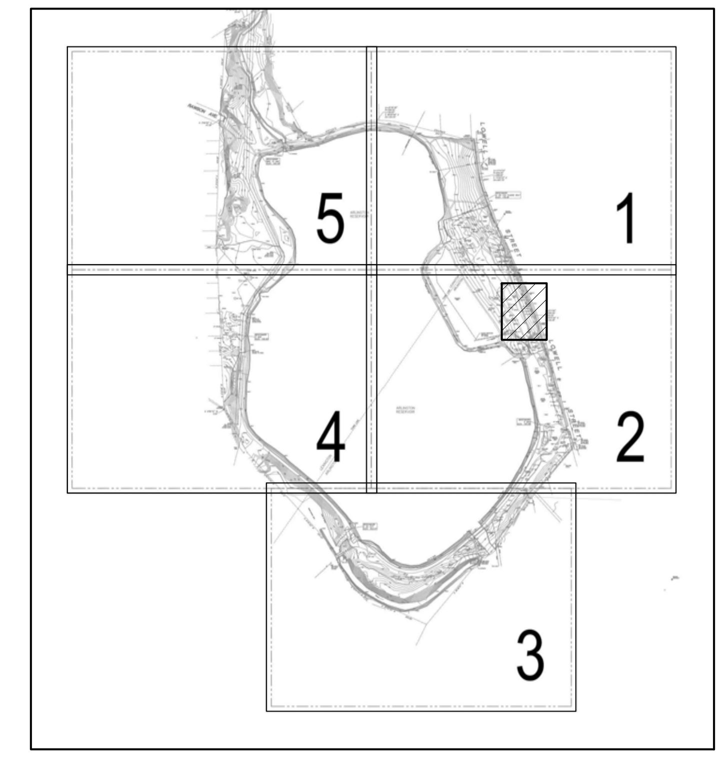
L2.2



LEGEND

L.O.W.	LIMIT OF WORK		PICNIC TABLE
	PEDESTRIAN ASPHALT		BLACK VINYL COATED CHAIN LINK FENCE
	WOOD FIBER SURFACING		BLACK VINYL COATED CHAIN LINK FENCE GATE
	POUR-IN-PLACE RUBBER SURFACING		THERMOPLASTIC PAVEMENT GRAPHICS
	SET BOULDERS. VOIDS LARGER THAN 6" TO BE FIELD WITH SMALLER STONES TO MATCH AND MORTARED		PLACED BOULDER
	CONCRETE PAVEMENT		

NOTE:
1. PERIMETER TRAIL BENCH LOCATIONS SHALL BE FIELD VERIFIED BY LANDSCAPE ARCHITECT PRIOR TO INSTALLATION



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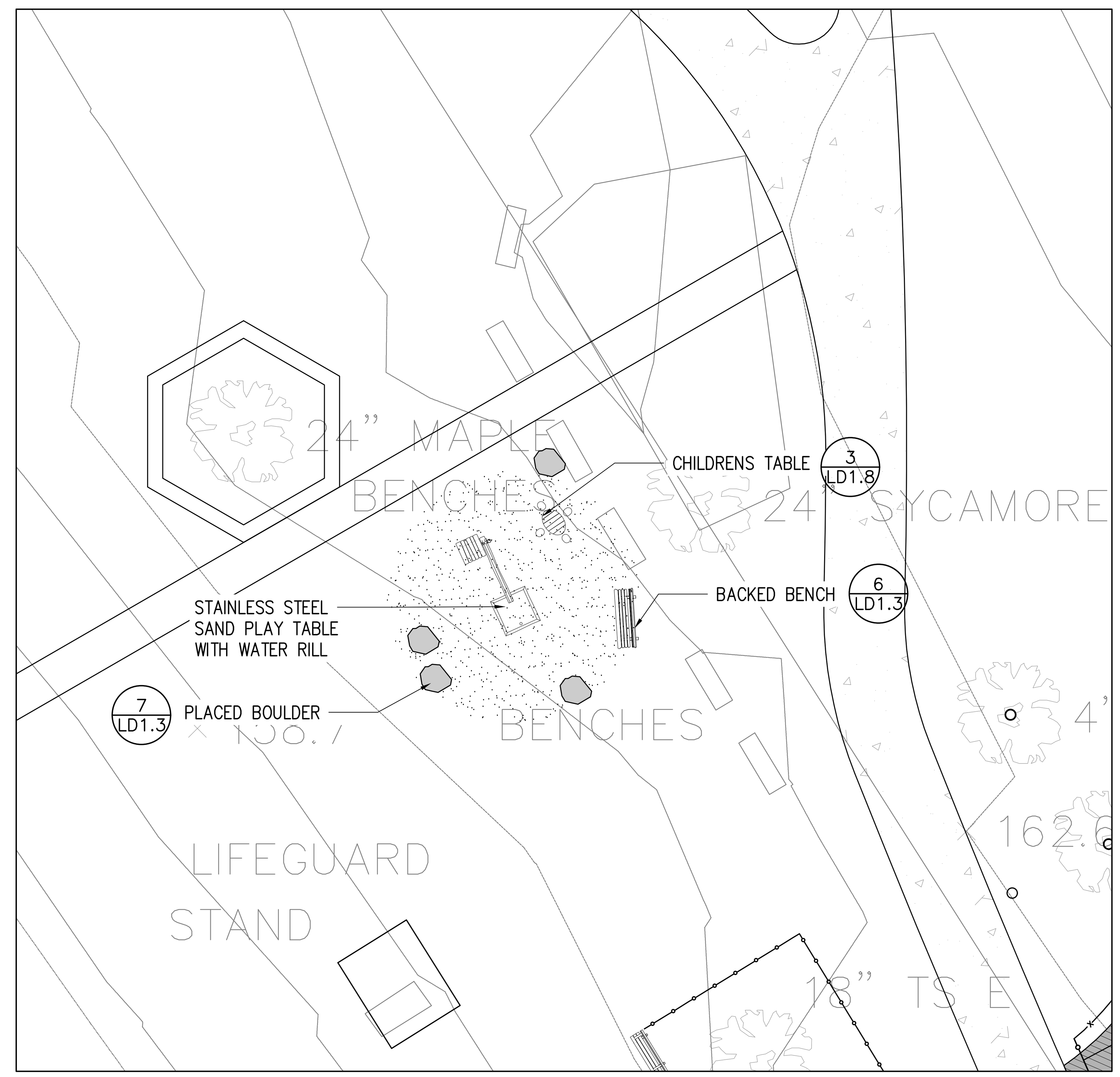

ENLARGEMENT - SAND AND WATER PLAY

10 0 10 20 FT

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

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Kyle Zick Landscape Architecture, Inc.
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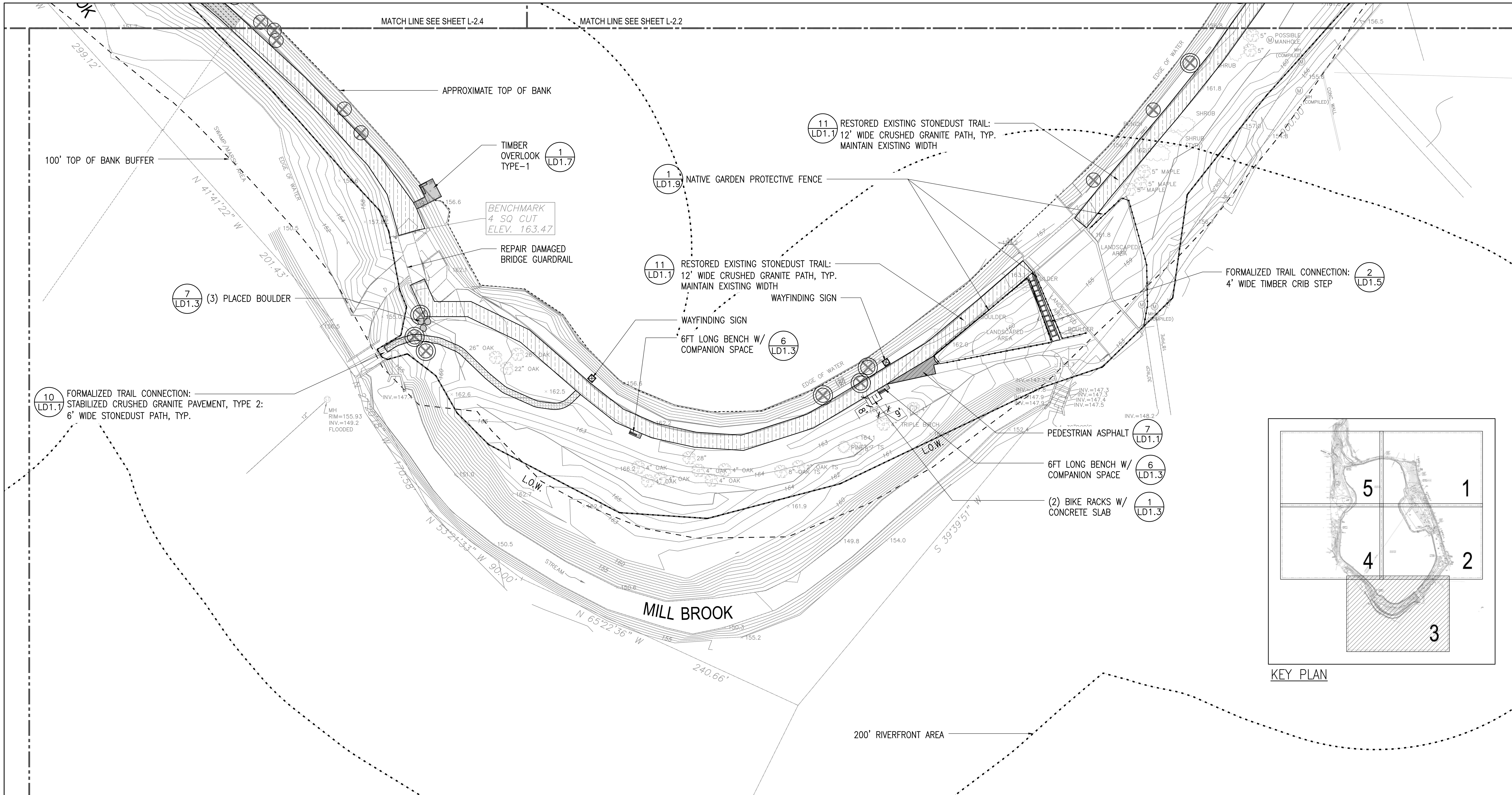
100% DESIGN DEVELOPMENT SET

Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB Checked By: KZ
Date: NOVEMBER 13, 2020
Scale: 1"=10'-0"
Drawing Title:

ENLARGED LAYOUT AND MATERIAL PLAN

L2.2A



LEGEND

L.O.W. LIMIT OF WORK	CONCRETE PAVEMENT	PICNIC TABLE
RESTORED EXISTING STONEDUST TRAIL	PERMEABLE CONCRETE UNIT PAVER	SPLIT RAIL FENCE
CRUSHED GRANITE PAVEMENT, TYPE 1 (NON-STABILIZED)	MULTI-USE COURT SURFACE	BLACK VINYL COATED CHAIN LINK FENCE
CRUSHED GRANITE PAVEMENT, TYPE 2 (STABILIZED)	POROUS PAVEMENT	BLACK VINYL COATED CHAIN LINK FENCE GATE
PEDESTRIAN ASPHALT		TRASH RECEPTACLE AND RECYCLING BIN
VEHICULAR ASPHALT		BIKE RACK
WOOD FIBER SURFACING		6FT LONG BENCH W/ COMPANION SPACE
POURED-IN-PLACE RUBBER SURFACING		CHAIN LINK FENCE CANTILEVER GATE
		WOODEN GATE W/ GRANITE POST
		PLACED BOULDER
		WAYFINDING SIGN
		RESET GRANITE MILE MARKER

TIMBER OVERLOOKS -TYPES 1 & 2
ARMORED SLOPE
TABLE AND CHAIRS
NEW LIFE GUARD STAND WITH SHADE STRUCTURE
HEXAGONAL BENCH
APPROXIMATE TOP OF BANK
100' TOP OF BANK BUFFER
200' RIVERFRONT AREA

NOTE:
1. PERIMETER TRAIL BENCH LOCATIONS SHALL BE FIELD VERIFIED BY LANDSCAPE ARCHITECT PRIOR TO INSTALLATION

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO.	REVISION	DATE

kzla
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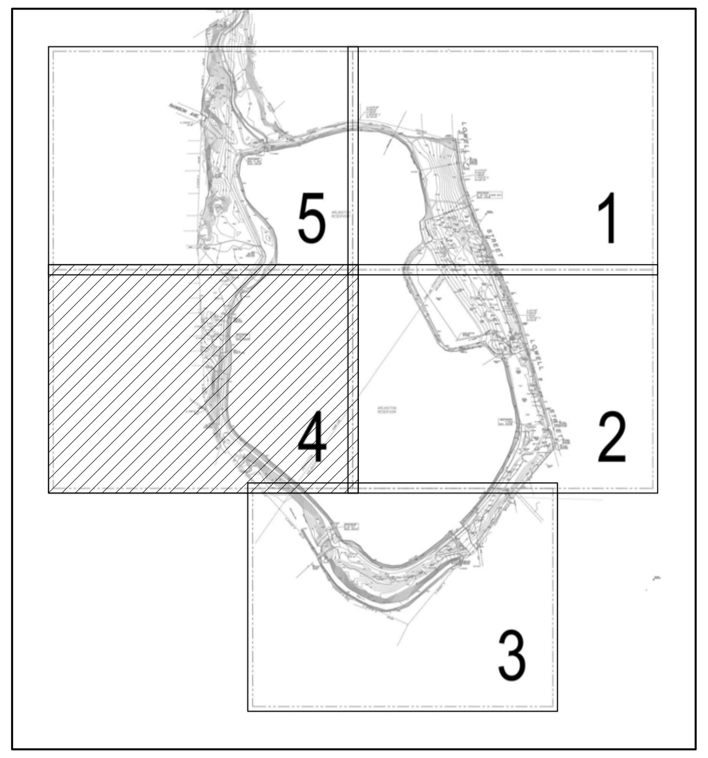
100% DESIGN DEVELOPMENT SET

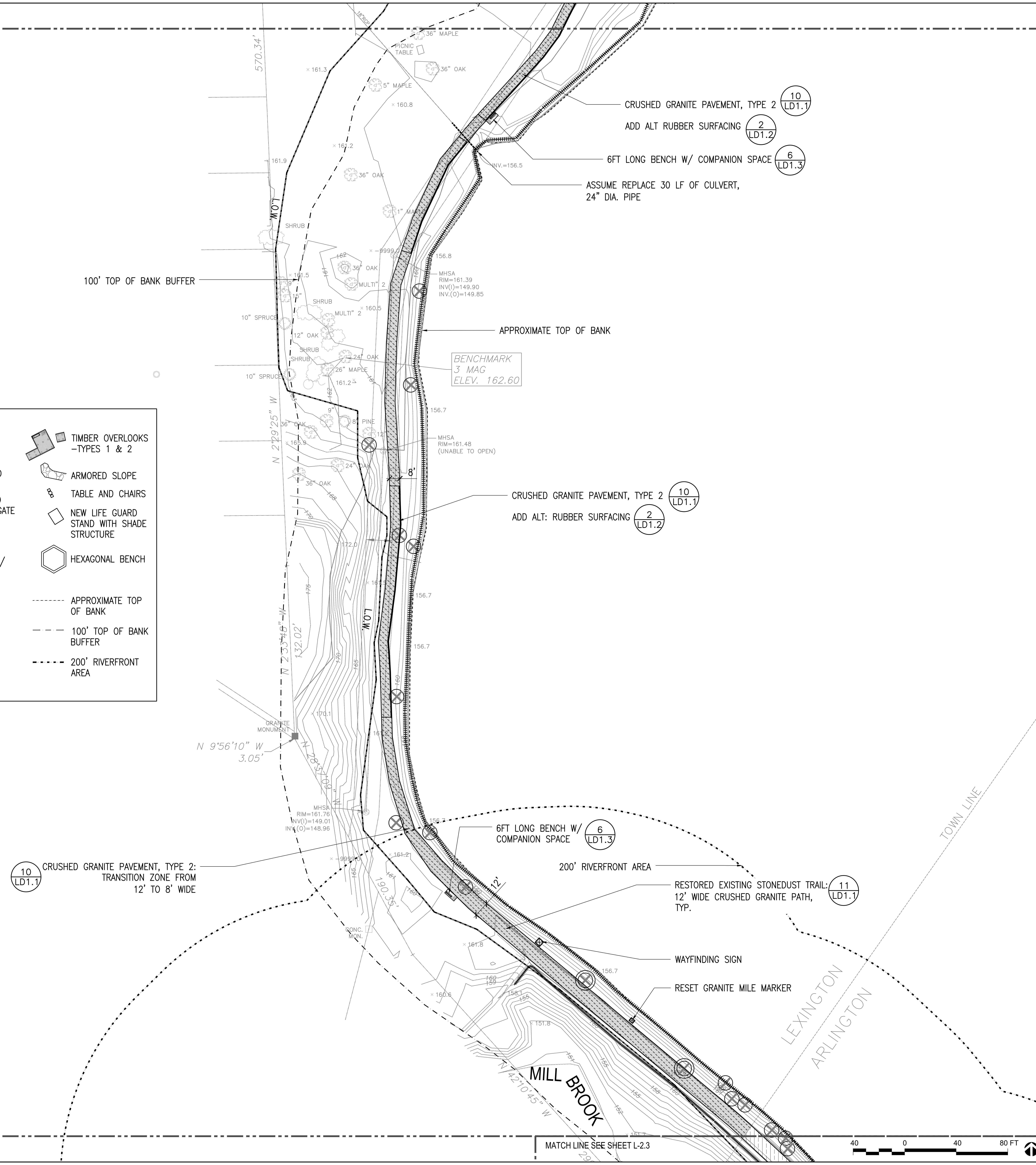
Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB Checked By: KZ
Date: NOVEMBER 13, 2020
Scale: 1"=40'-0"
Drawing Title:

LAYOUT AND MATERIAL PLAN

L2.3



KEY PLAN



LEGEND

LIMIT OF WORK (L.O.W.)	CONCRETE PAVEMENT	PICNIC TABLE	TIMBER OVERLOOKS -TYPES 1 & 2
RESTORED EXISTING STONEDUST TRAIL	PERMEABLE CONCRETE UNIT PAVER	SPLIT RAIL FENCE	ARMORED SLOPE
CRUSHED GRANITE PAVEMENT, TYPE 1 (NON-STABILIZED)	MULTI-USE COURT SURFACE	BLACK VINYL COATED CHAIN LINK FENCE	TABLE AND CHAIRS
CRUSHED GRANITE PAVEMENT, TYPE 2 (STABILIZED)	POROUS PAVEMENT	BLACK VINYL COATED CHAIN LINK FENCE GATE	NEW LIFE GUARD STAND WITH SHADE STRUCTURE
PEDESTRIAN ASPHALT		TRASH RECEPTACLE AND RECYCLING BIN	HEXAGONAL BENCH
VEHICULAR ASPHALT		BIKE RACK	APPROXIMATE TOP OF BANK
WOOD FIBER SURFACING		6FT LONG BENCH W/ COMPANION SPACE	100' TOP OF BANK BUFFER
POURED-IN-PLACE RUBBER SURFACING		CHAIN LINK FENCE CANTILEVER GATE	200' RIVERFRONT AREA
		WOODEN GATE W/ GRANITE POST	
		PLACED BOULDER	
		WAYFINDING SIGN	
		RESET GRANITE MILE MARKER	

NOTE:
1. PERIMETER TRAIL BENCH LOCATIONS SHALL BE FIELD VERIFIED BY LANDSCAPE ARCHITECT PRIOR TO INSTALLATION

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO.	REVISION	DATE

kzla
Kyle Zick Landscape Architecture, Inc.
36 Bromfield Street Suite 202
Boston, MA 02108
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www.kylezick.com

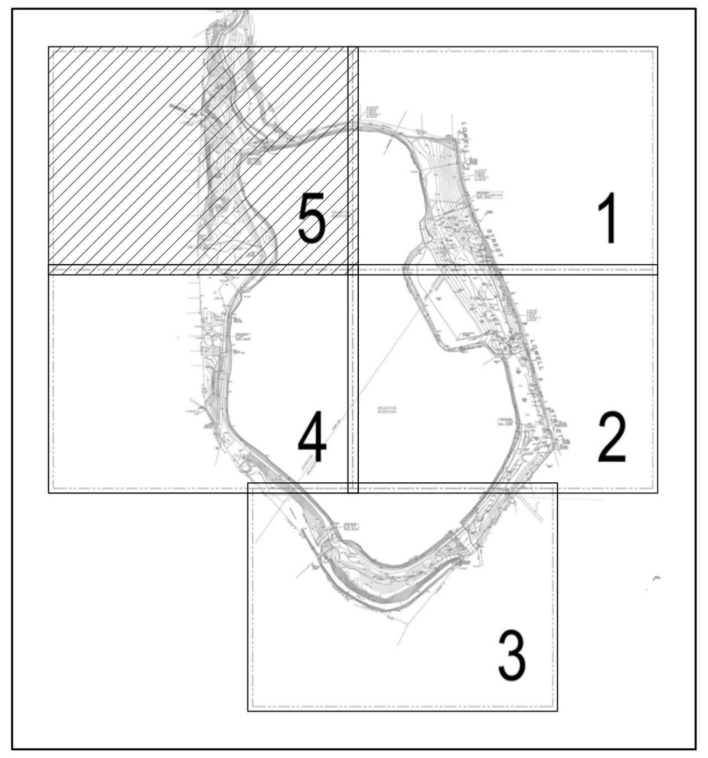
COMMONWEALTH OF MASSACHUSETTS · KYLE S. ZICK · REGISTERED LANDSCAPE ARCHITECT · No. 1169

100% DESIGN DEVELOPMENT SET

Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB
Checked By: KZ
Date: NOVEMBER 13, 2020
Scale: 1"=40'-0"
Drawing Title:

LAYOUT AND MATERIAL PLAN

L2.4

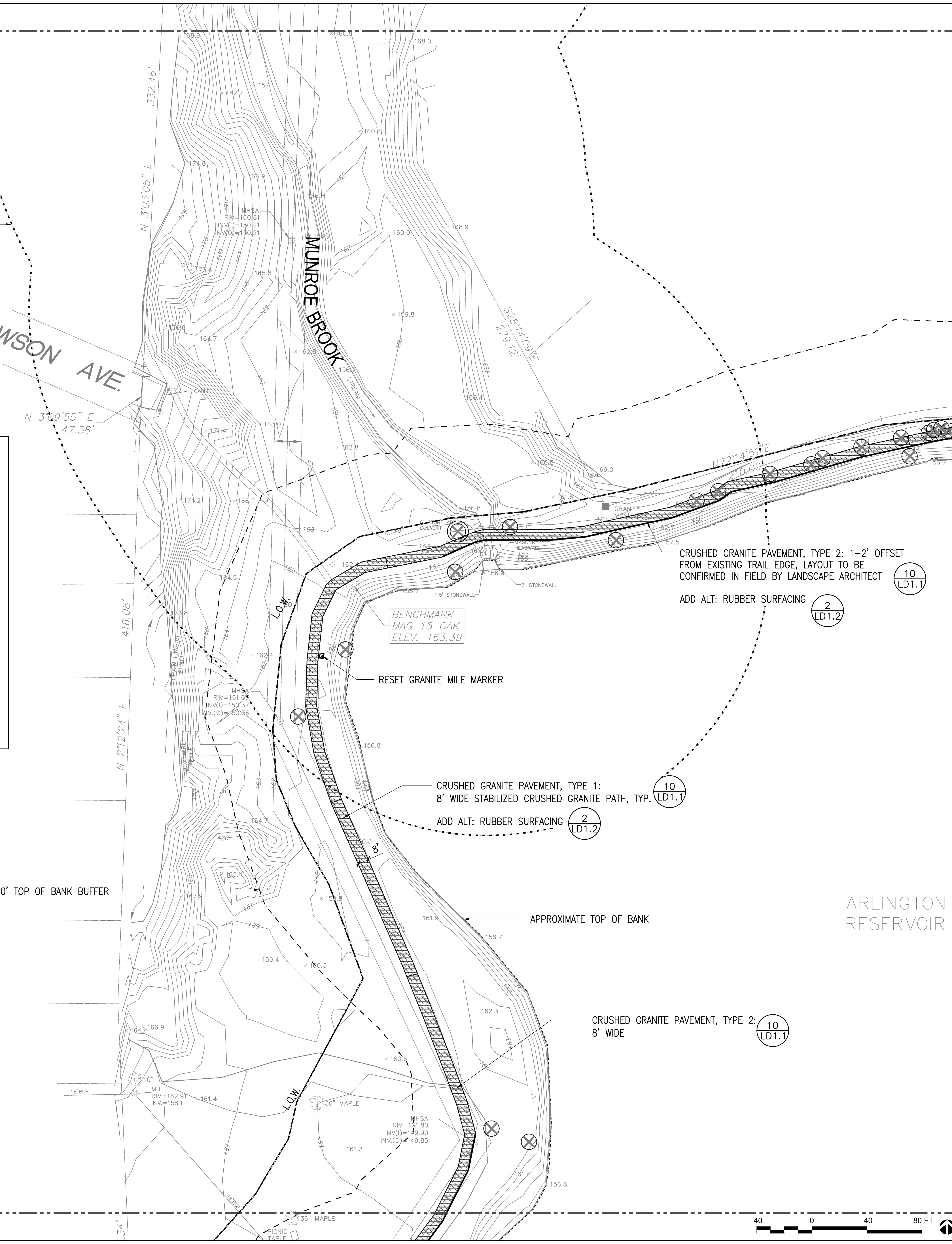


KEY PLAN

LEGEND

- L.O.W. LIMIT OF WORK
- RESTORED EXISTING STONEDUST TRAIL
- CRUSHED GRANITE PAVEMENT, TYPE 1 (NON-STABILIZED)
- CRUSHED GRANITE PAVEMENT, TYPE 2 (STABILIZED)
- PEDESTRIAN ASPHALT
- VEHICULAR ASPHALT
- WOOD FIBER SURFACING
- POURED-IN-PLACE RUBBER SURFACING
- CONCRETE PAVEMENT
- PERMEABLE CONCRETE UNIT PAVER
- MULTI-USE COURT SURFACE
- POROUS PAVEMENT
- PICNIC TABLE
- SPLIT RAIL FENCE
- BLACK VINYL COATED CHAIN LINK FENCE
- BLACK VINYL COATED CHAIN LINK FENCE GATE
- TRASH RECEPTACLE AND RECYCLING BIN
- BIKE RACK
- 6FT LONG BENCH W/ COMPANION SPACE
- CHAIN LINK FENCE CANTILEVER GATE
- WOODEN GATE W/ GRANITE POST
- PLACED BOULDER
- WAYFINDING SIGN
- RESET GRANITE MILE MARKER
- TIMBER OVERLOOKS -TYPES 1 & 2
- ARMORED SLOPE
- TABLE AND CHAIRS
- NEW LIFE GUARD STAND WITH SHADE STRUCTURE
- HEXAGONAL BENCH
- APPROXIMATE TOP OF BANK
- 100' TOP OF BANK BUFFER
- 200' RIVERFRONT AREA

NOTE:
1. PERIMETER TRAIL BENCH LOCATIONS SHALL BE FIELD VERIFIED BY LANDSCAPE ARCHITECT PRIOR TO INSTALLATION



MATCH LINE SEE SHEET L-2.1

MATCH LINE SEE SHEET L-2.4

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO.	REVISION	DATE

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617 451-1018 Tel
www.kylezick.com

100% DESIGN DEVELOPMENT SET

Job Number:
Project: ARLINGTON RES.
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Checked By: KZ
Date: NOVEMBER 13, 2020
Scale: 1"=40'-0"
Drawing Title:

LAYOUT AND MATERIAL PLAN

L2.5

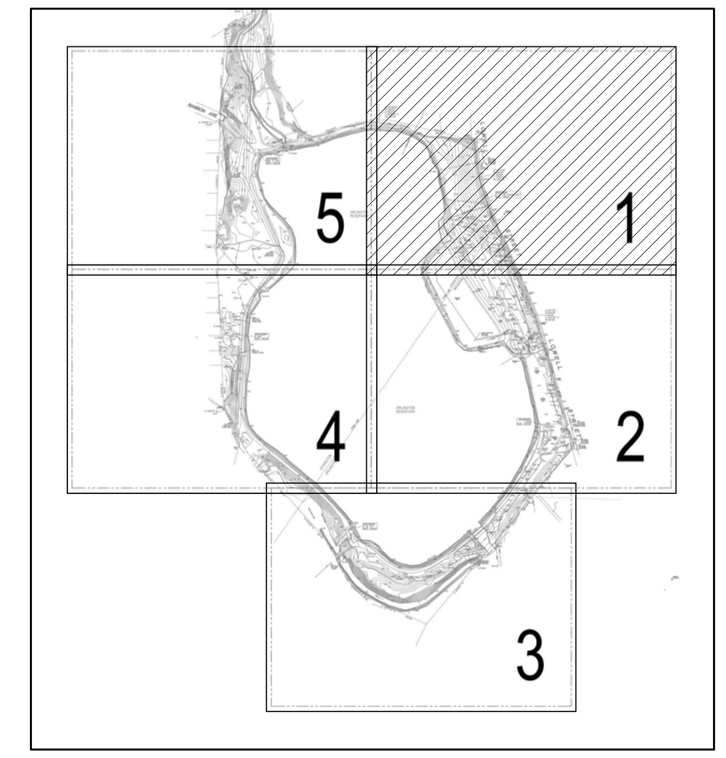
MATCH LINE SEE SHEET L-3.5

LEGEND

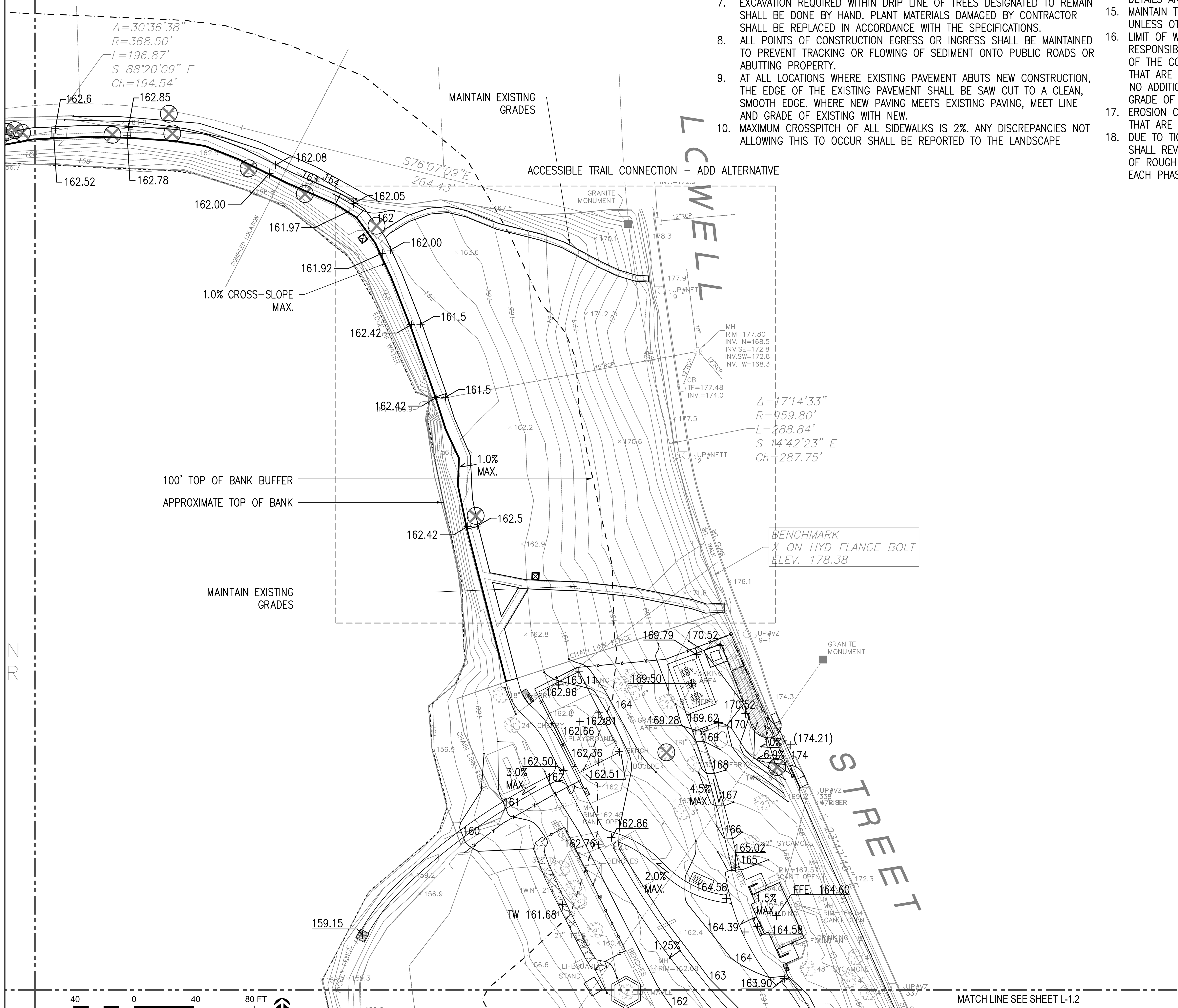
L.O.W.	LIMIT OF WORK	HP	HIGH POINT
138	PROPOSED CONTOUR, TYP.	LP	LOW POINT
138	EXISTING CONTOUR, TYP.	BC	BOTTOM OF CURB
+ 74.50	SPOT GRADE, TYP.	TC	TOP OF CURB
+ (74.50)	EXISTING SPOT GRADE, TYP.	BW	BOTTOM OF WALL
X%	SLOPE, TYP.	TW	TOP OF WALL
	APPROXIMATE TOP OF BANK	BOS	BOTTOM OF STAIR
	100' RESOURCE BUFFER	TOS	TOP OF STAIR
	200' RIVERFRONT AREA	RIM	CATCH BASIN RIM

GRADING NOTES:

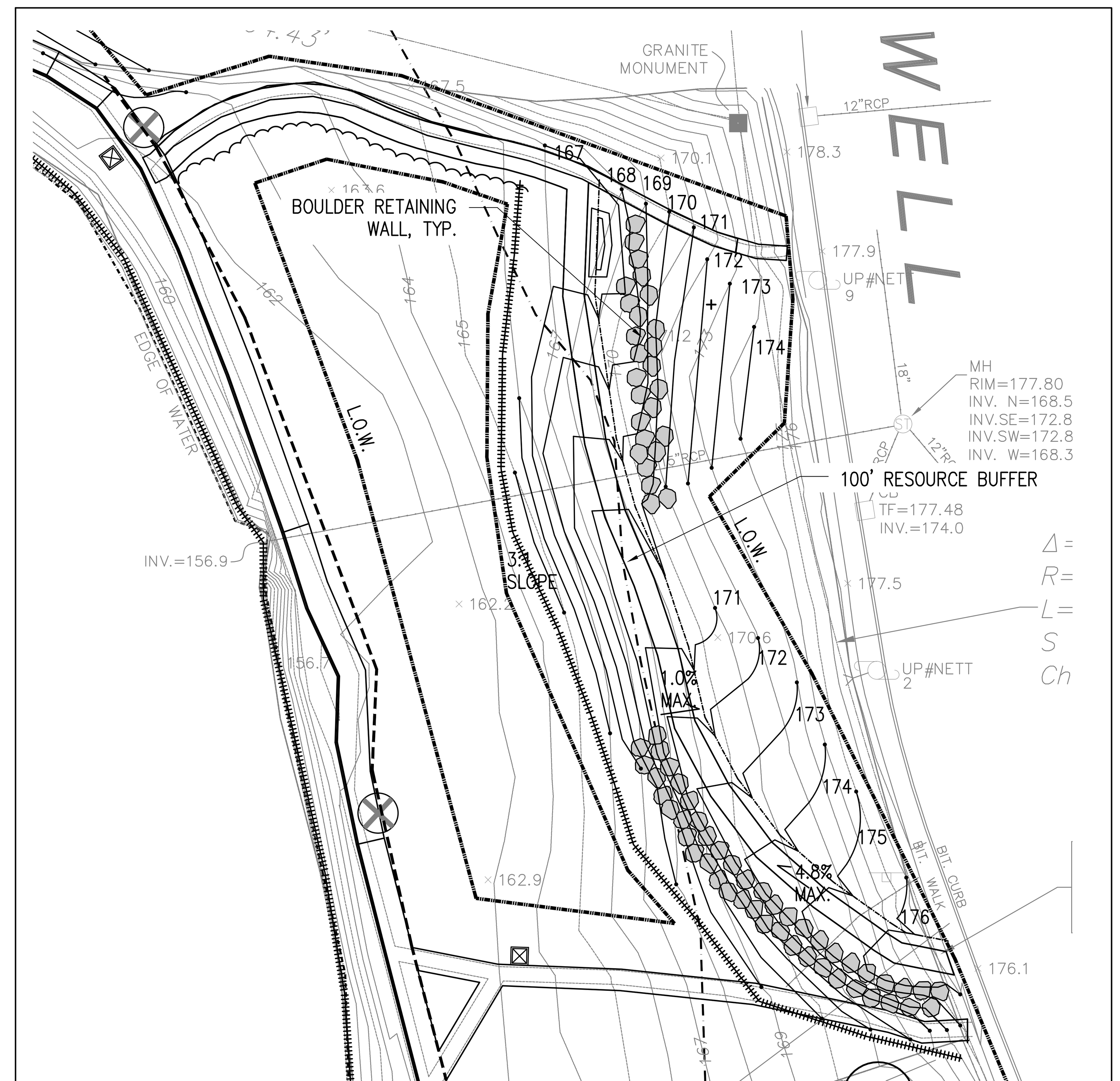
1. PRIOR TO COMMENCING ANY EXCAVATION WORK, THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES IN ACCORDANCE WITH THE "DIG SAFE" NOTIFICATION PROCEDURES PROMOTED BY RESPECTIVE UTILITY COMPANIES. THE 'DIG SAFE' TELEPHONE NUMBER FOR MASSACHUSETTS IS 811.
2. BOTTOM OF CURB ELEVATIONS BETWEEN EXISTING SPOT GRADES SHOWN ON SURVEY ARE INTERPOLATIONS. CONTRACTOR SHALL VERIFY ALL EXISTING GRADES IN THE FIELD AND SHALL REPORT ANY DISCREPANCIES BETWEEN EXISTING AND PROPOSED CONDITION TO THE LANDSCAPE ARCHITECT.
3. ANY AREA OUTSIDE THE LIMIT OF WORK THAT IS DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO COST TO THE OWNER.
4. COMPACT SUBGRADE PRIOR TO ANY FINISH GRADING. REMOVE ALL SOFT SPOTS OBSERVED OR IDENTIFIED IN FIELD.
5. PITCH EVENLY BETWEEN SPOT GRADES. ALL PAVED AREAS MUST PITCH TO DRAIN AT A MINIMUM SLOPE OF ONE-EIGHTH INCH (1/8") PER FOOT. ANY DISCREPANCIES NOT ALLOWING THIS TO OCCUR SHALL BE REPORTED TO THE LANDSCAPE ARCHITECT PRIOR TO CONTINUING WORK.
6. CONTRACTOR SHALL BLEND NEW EARTHWORK SMOOTHLY INTO EXISTING, PROVIDING VERTICAL CURVES OR ROUNDINGS AT ALL TOP AND BOTTOM OF SLOPES.
7. EXCAVATION REQUIRED WITHIN DRIP LINE OF TREES DESIGNATED TO REMAIN SHALL BE DONE BY HAND. PLANT MATERIALS DAMAGED BY CONTRACTOR SHALL BE REPLACED IN ACCORDANCE WITH THE SPECIFICATIONS.
8. ALL POINTS OF CONSTRUCTION EGRESS OR INGRESS SHALL BE MAINTAINED TO PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADS OR ABUTTING PROPERTY.
9. AT ALL LOCATIONS WHERE EXISTING PAVEMENT ABUTS NEW CONSTRUCTION, THE EDGE OF THE EXISTING PAVEMENT SHALL BE SAW CUT TO A CLEAN, SMOOTH EDGE. WHERE NEW PAVING MEETS EXISTING PAVING, MEET LINE AND GRADE OF EXISTING WITH NEW.
10. MAXIMUM CROSSPITCH OF ALL SIDEWALKS IS 2%. ANY DISCREPANCIES NOT ALLOWING THIS TO OCCUR SHALL BE REPORTED TO THE LANDSCAPE ARCHITECT.
11. ALL GRADING SHALL COMPLY WITH THE RULES AND REGULATIONS OF THE OFFICIAL MANUAL OF THE MASSACHUSETTS ARCHITECTURAL ACCESS BOARD AND THE AMERICANS WITH DISABILITIES ACT STANDARDS FOR BUILDINGS AND FACILITIES, LATEST EDITION. IN CASE OF CONFLICT BETWEEN REGULATIONS, THE GUIDELINE PROVIDING GREATER ACCESS SHALL APPLY.
12. UTILITIES SHOWN ON THIS PLAN FOR REFERENCE ONLY. CONTRACTOR SHALL COORDINATE LOCATION OF ALL UTILITIES (LINES, DUCTS, CONDUITS, SLEEVES, FOOTINGS, ETC.) WITH LOCATIONS OF PROPOSED LANDSCAPE ELEMENTS (WALLS, FENCE, FOOTINGS, TREE ROOTBALLS, PROPOSED LIGHTING FOOTINGS, ETC.). EXCAVATION REQUIRED WITHIN PROXIMITY OF UTILITY LINES SHALL BE DONE BY HAND. ANY DAMAGE AND INCURRED COSTS DUE TO FAILURE OF THE CONTRACTOR TO CONTACT THE PROPER AUTHORITIES SHALL BE BORNE BY THE CONTRACTOR.
13. CONTRACTOR SHALL MAINTAIN OR ADJUST TO PROPOSED FINISH GRADE AS NECESSARY ALL UTILITY AND SITE STRUCTURES SUCH AS LIGHT POLES, SIGN POSTS, MANHOLES, CATCH BASINS, HAND HOLES, WATER AND GAS GATES, HYDRANTS, ETC., FROM MAINTAINED UTILITY AND SITE SYSTEMS UNLESS OTHERWISE NOTED ON UTILITY DRAWINGS OR AS DIRECTED BY LANDSCAPE ARCHITECT.
14. CONTRACTOR SHALL PROVIDE FULL DEPTHS OF LOAM AS NOTED ON DETAILS AND AS SPECIFIED, FOR ALL PLANTING.
15. MAINTAIN THE INTEGRITY OF THE EXISTING DRAINAGE SYSTEM AT ALL TIMES, UNLESS OTHERWISE NOTED ON DRAWINGS.
16. LIMIT OF WORK LINE IS NOTED ON DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGE DUE TO OPERATIONS INSIDE AND OUTSIDE OF THE CONTRACT LIMIT LINE. ANY AREAS OUTSIDE THE LIMIT OF WORK THAT ARE DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO ADDITIONAL COST TO THE OWNER. CONTRACTOR SHALL MEET LINE AND GRADE OF EXISTING CONDITIONS AT LIMIT OF WORK LINE.
17. EROSION CONTROL BLANKETS SHALL BE USED ON NEWLY GRADED SLOPES THAT ARE EQUAL TO OR STEEPER THAN A 3:1 SLOPE.
18. DUE TO TIGHT GRADING REQUIREMENTS FOR PAVED SURFACES, CONTRACTOR SHALL REVIEW GRADING WITH LANDSCAPE ARCHITECT AT THE COMPLETION OF ROUGH GRADING AND AT THE COMPLETION OF BINDER COURSE FOR EACH PHASE.



KEY PLAN



MATCH LINE SEE SHEET L-1.2



ACCESSIBLE TRAIL CONNECTION - ADD ALTERNATIVE
SCALE: 1" = 30'-0"

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO.	REVISION	DATE

kzla
Kyle Zick Landscape Architecture, Inc.
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Boston, MA 02108
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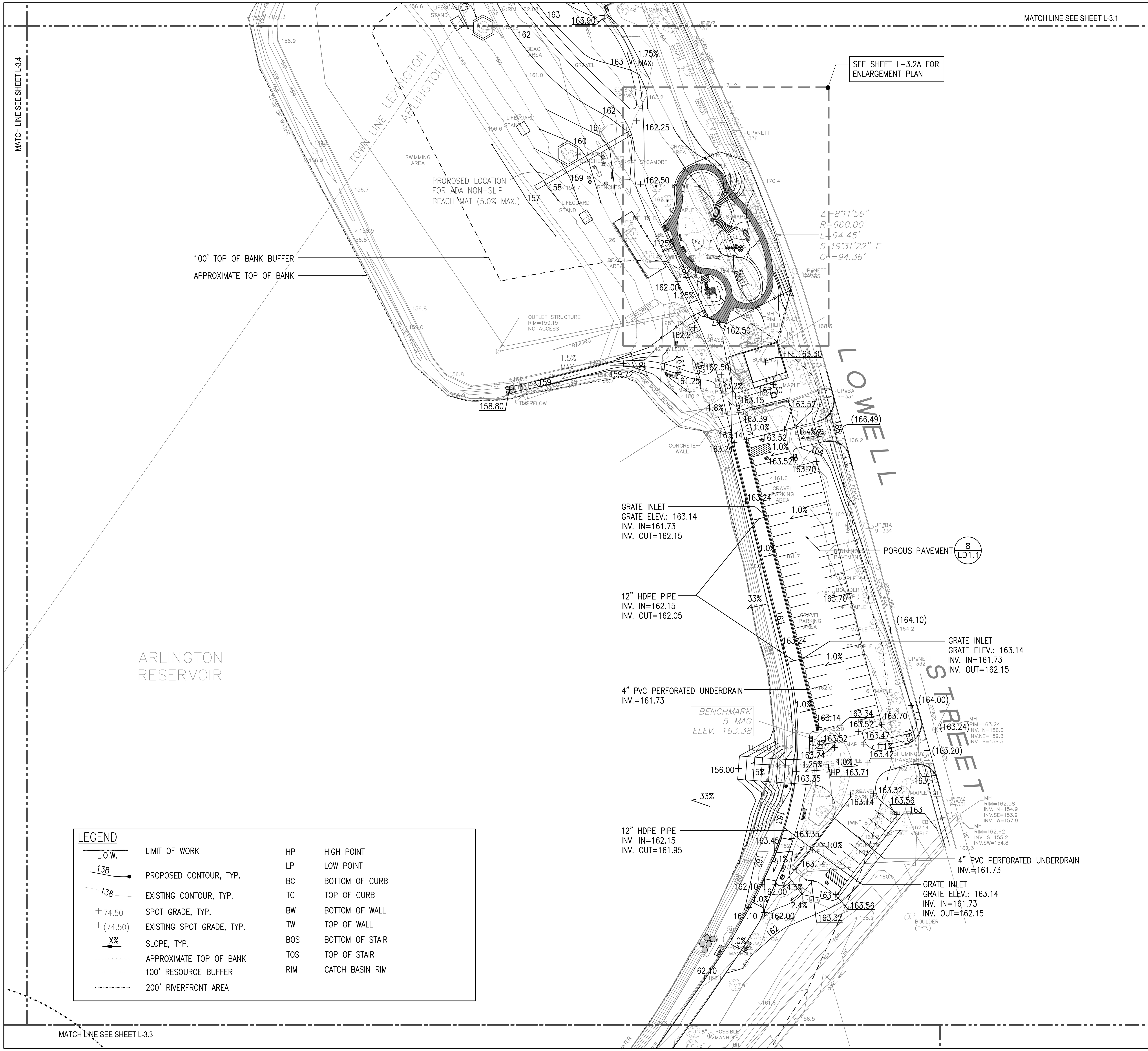
www.kylezick.com

100% DESIGN DEVELOPMENT SET

Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB
Checked By: KZ
Date: NOVEMBER 13, 2020
Scale: 1"=40'-0"
Drawing Title:

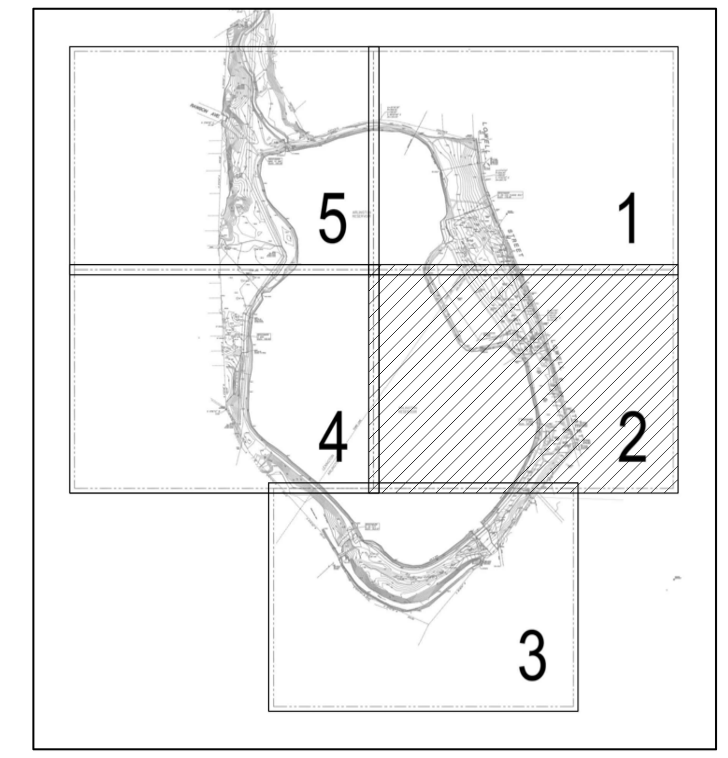
GRADING PLAN

L3.1



LEGEND

L.O.W.	LIMIT OF WORK	HP	HIGH POINT
138	PROPOSED CONTOUR, TYP.	LP	LOW POINT
138	EXISTING CONTOUR, TYP.	BC	BOTTOM OF CURB
+74.50	SPOT GRADE, TYP.	TC	TOP OF CURB
+(74.50)	EXISTING SPOT GRADE, TYP.	BW	BOTTOM OF WALL
X%	SLOPE, TYP.	TW	TOP OF WALL
	APPROXIMATE TOP OF BANK	BOS	BOTTOM OF STAIR
	100' RESOURCE BUFFER	TOS	TOP OF STAIR
	200' RIVERFRONT AREA	RIM	CATCH BASIN RIM



KEY PLAN

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

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kzla
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100% DESIGN DEVELOPMENT SET

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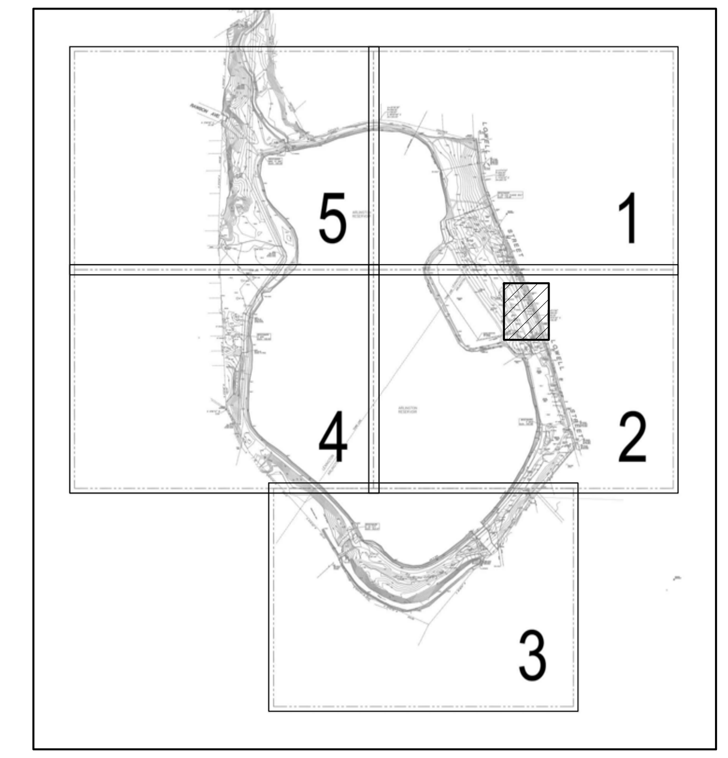
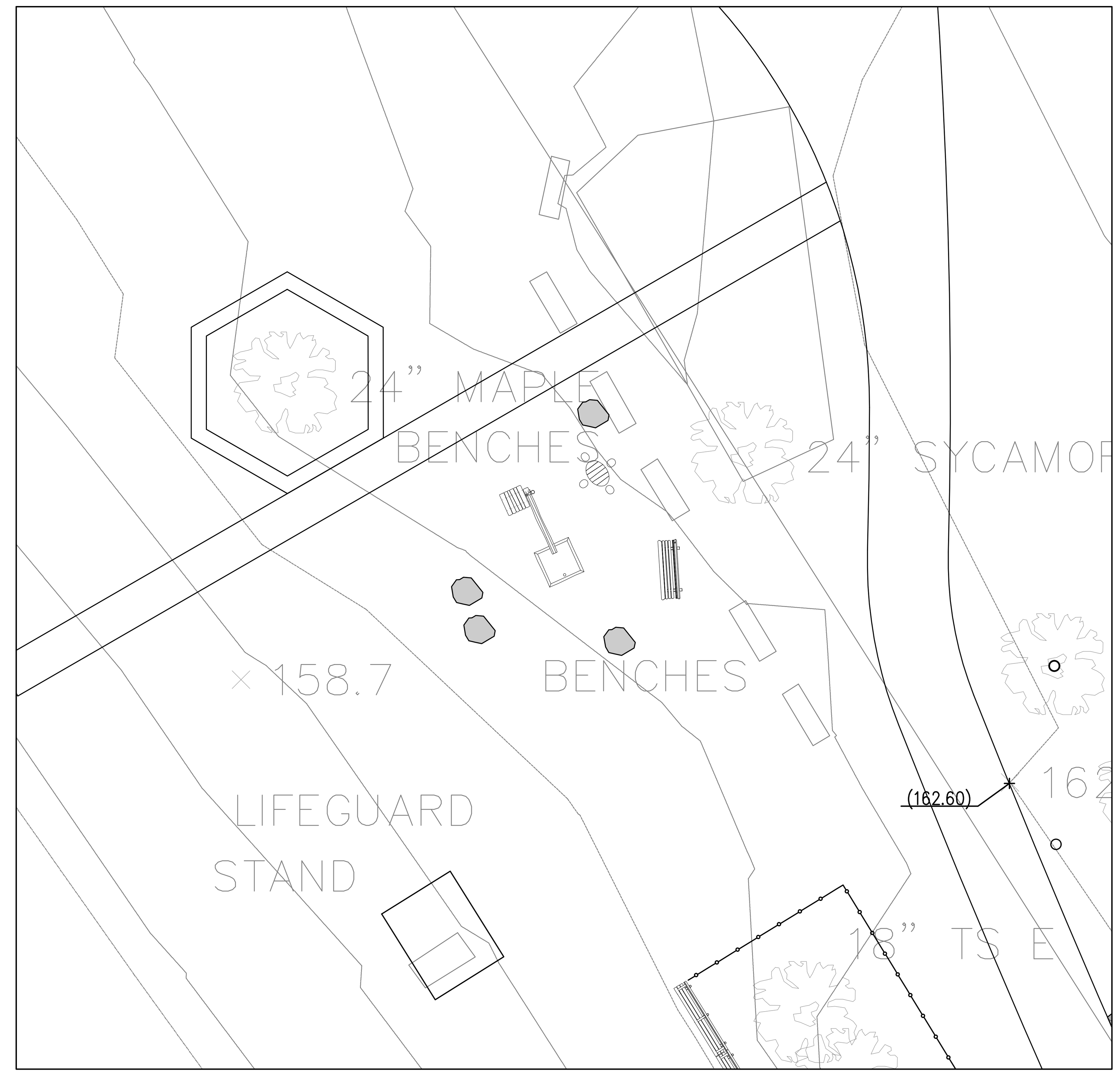
Drawing Title:

GRADING PLAN

L3.2



KEY PLAN



LEGEND

L.O.W.	LIMIT OF WORK	HP	HIGH POINT
138	PROPOSED CONTOUR, TYP.	LP	LOW POINT
138	EXISTING CONTOUR, TYP.	BC	BOTTOM OF CURB
74.50	SPOT GRADE, TYP.	TC	TOP OF CURB
(74.50)	EXISTING SPOT GRADE, TYP.	BW	BOTTOM OF WALL
X%	SLOPE, TYP.	TW	TOP OF WALL
	APPROXIMATE TOP OF BANK	BOS	BOTTOM OF STAIR
	100' RESOURCE BUFFER	TOS	TOP OF STAIR
	200' RIVERFRONT AREA	RIM	CATCH BASIN RIM

10 0 10 20 FT

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO.	REVISION	DATE

kzla
Kyle Zick Landscape Architecture, Inc.
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Boston, MA 02108
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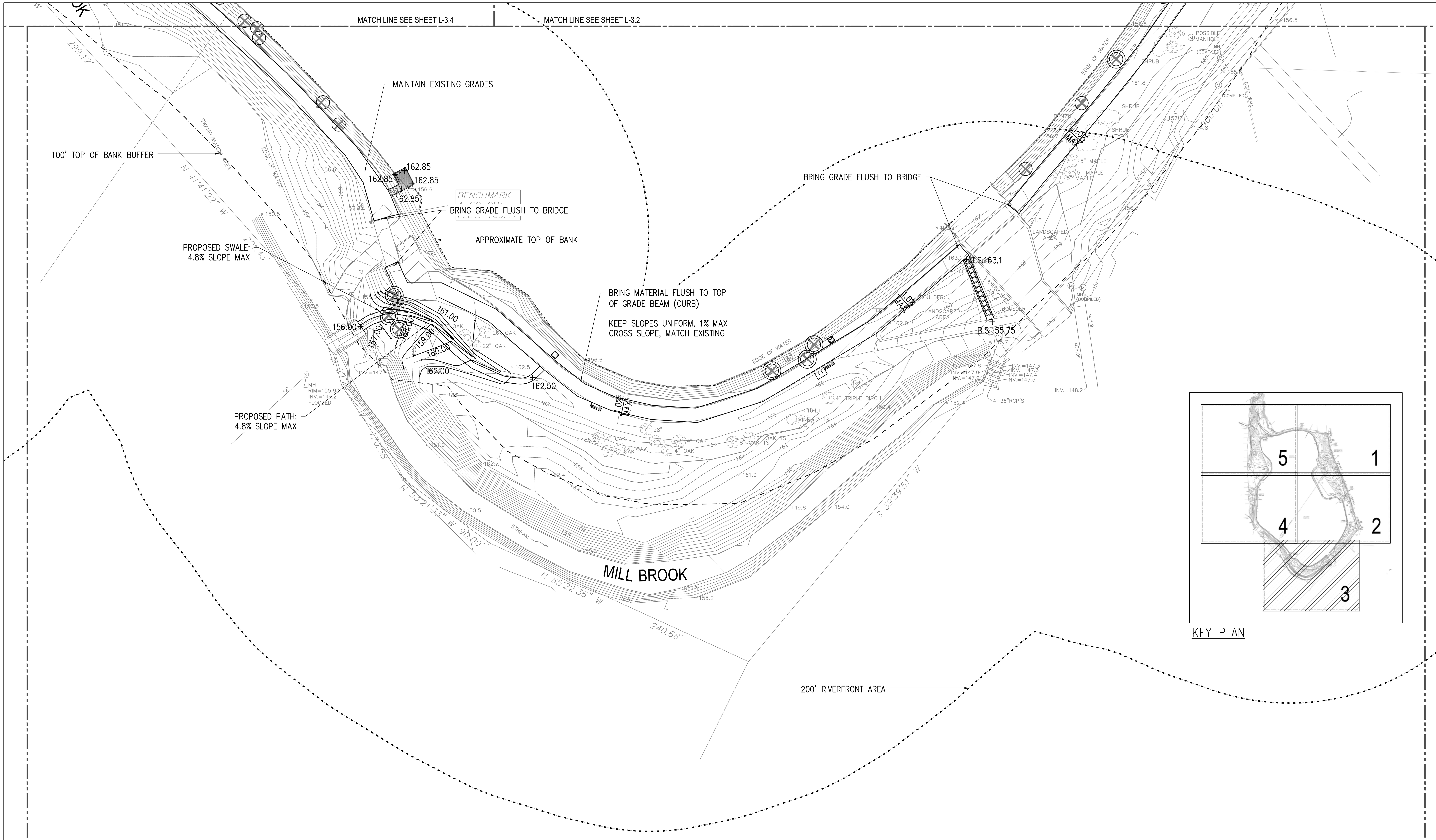
KYLE S. ZICK MASSACHUSETTS REGISTERED LANDSCAPE ARCHITECT

100% DESIGN DEVELOPMENT SET

Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB | Checked By: KZ
Date: NOVEMBER 13, 2020
Scale: 1"=10'-0"
Drawing Title:

ENLARGED GRADING PLAN

L3.2A



LEGEND

L.O.W.	LIMIT OF WORK	HP	HIGH POINT
138	PROPOSED CONTOUR, TYP.	LP	LOW POINT
138	EXISTING CONTOUR, TYP.	BC	BOTTOM OF CURB
+74.50	SPOT GRADE, TYP.	TC	TOP OF CURB
+(74.50)	EXISTING SPOT GRADE, TYP.	BW	BOTTOM OF WALL
X%	SLOPE, TYP.	TW	TOP OF WALL
	APPROXIMATE TOP OF BANK	BOS	BOTTOM OF STAIR
	100' RESOURCE BUFFER	TOS	TOP OF STAIR
	200' RIVERFRONT AREA	RIM	CATCH BASIN RIM

40 0 40 80 FT

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO.	REVISION	DATE

kzla
Kyle Zick Landscape Architecture, Inc.
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617 451-1018 Tel
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COMMONWEALTH OF MASSACHUSETTS KYLE S. ZICK No. 1155 REGISTERED LANDSCAPE ARCHITECT

100% DESIGN DEVELOPMENT SET

Job Number:
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Drawn By: JL/MD/RB | Checked By: KZ
Date: NOVEMBER 13, 2020
Scale: 1"=40'-0"
Drawing Title:

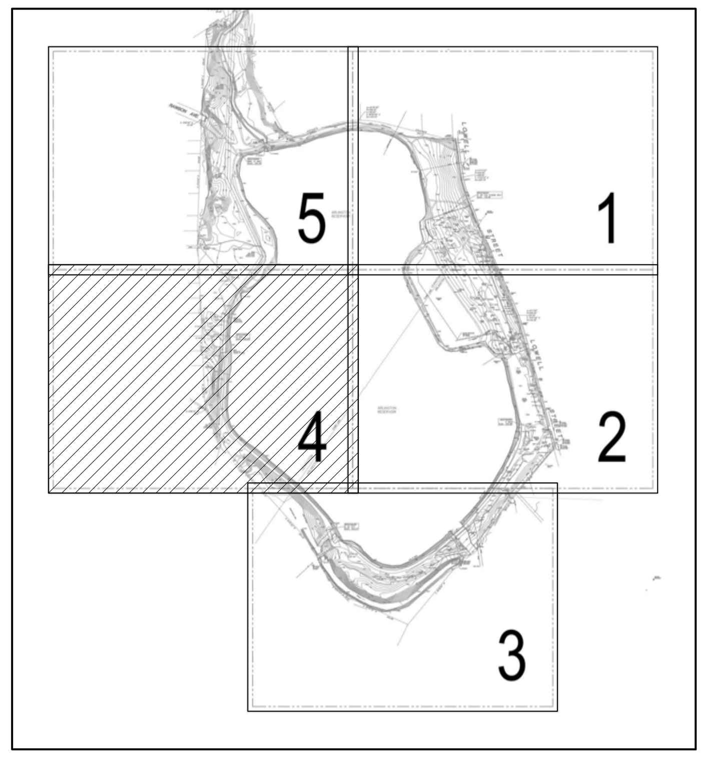
GRADING PLAN

L3.3

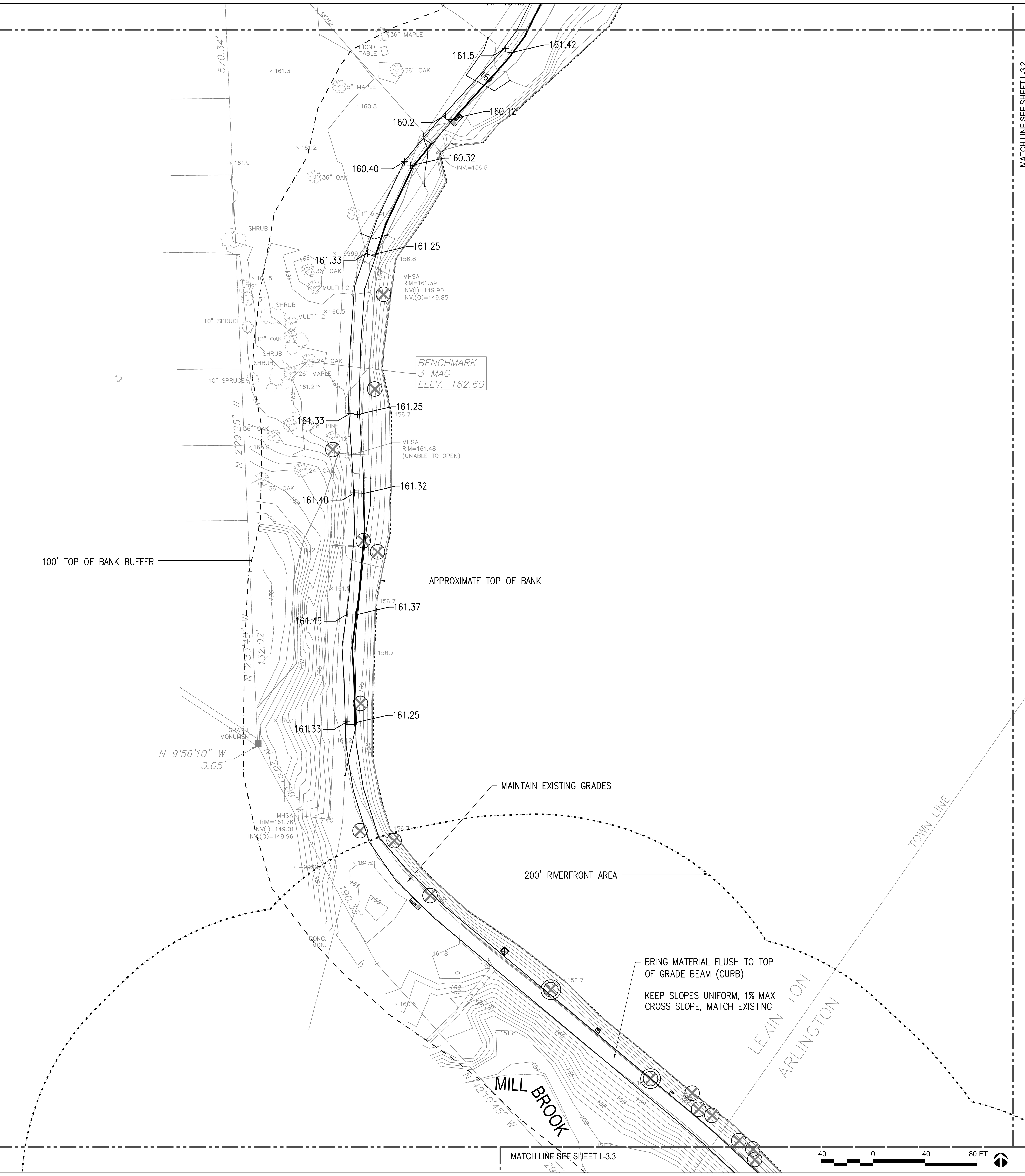
ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON



KEY PLAN



LEGEND

L.O.W.	LIMIT OF WORK	HP	HIGH POINT
138	PROPOSED CONTOUR, TYP.	LP	LOW POINT
138	EXISTING CONTOUR, TYP.	BC	BOTTOM OF CURB
+74.50	SPOT GRADE, TYP.	TC	TOP OF CURB
+(74.50)	EXISTING SPOT GRADE, TYP.	BW	BOTTOM OF WALL
X%	SLOPE, TYP.	TW	TOP OF WALL
	APPROXIMATE TOP OF BANK	BOS	BOTTOM OF STAIR
	100' RESOURCE BUFFER	TOS	TOP OF STAIR
	200' RIVERFRONT AREA	RIM	CATCH BASIN RIM

NO.	REVISION	DATE

kzla
Kyle Zick Landscape Architecture, Inc.
36 Bromfield Street Suite 202
Boston, MA 02108
617 451-1018 Tel
www.kylezick.com

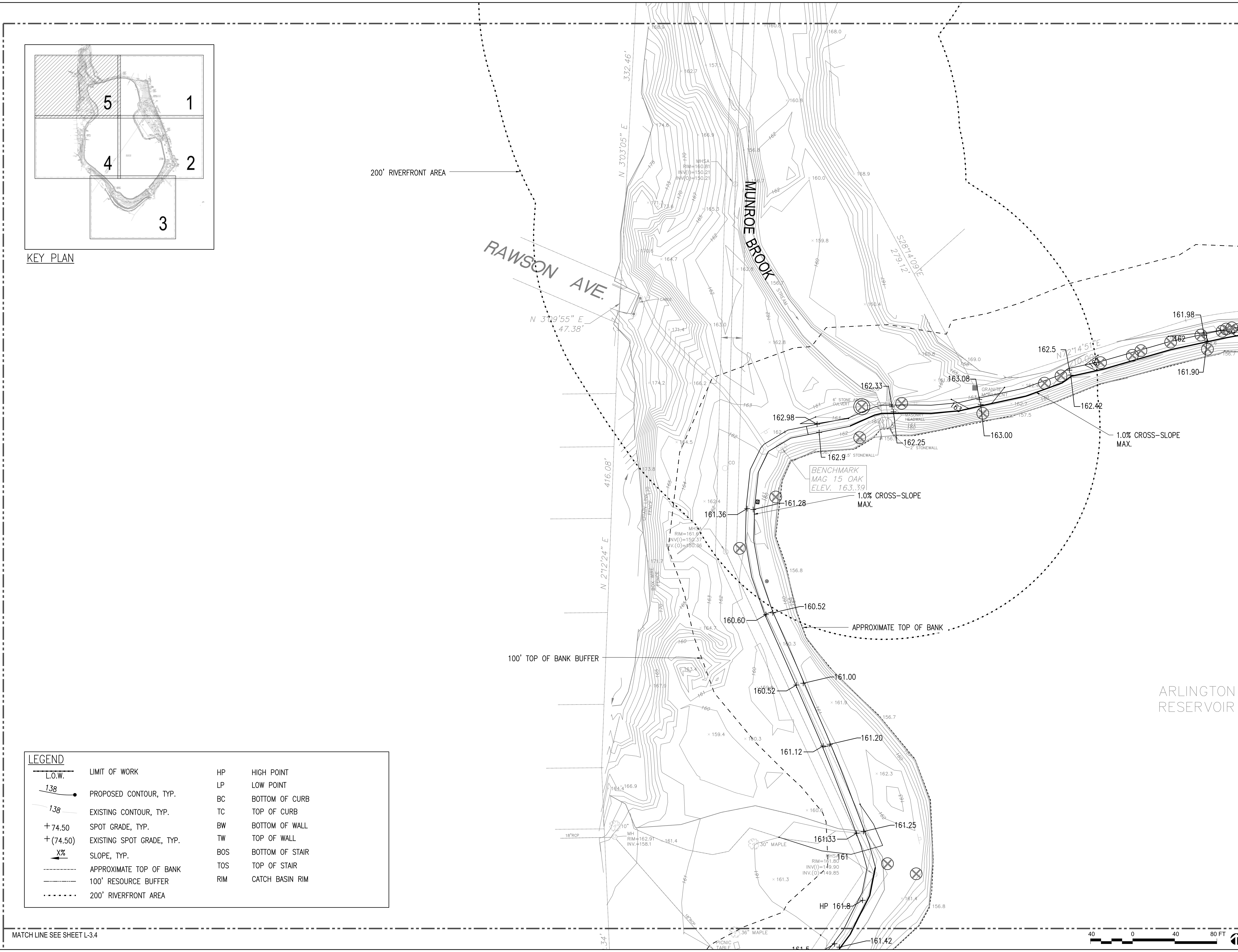
MASSACHUSETTS KYLE S. ZICK REGISTERED LANDSCAPE ARCHITECT

100% DESIGN DEVELOPMENT SET

Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB | Checked By: KZ
Date: NOVEMBER 13, 2020
Scale: 1"=40'-0"
Drawing Title:

GRADING PLAN

L3.4



LEGEND

L.O.W.	LIMIT OF WORK	HP	HIGH POINT
138	PROPOSED CONTOUR, TYP.	LP	LOW POINT
138	EXISTING CONTOUR, TYP.	BC	BOTTOM OF CURB
+74.50	SPOT GRADE, TYP.	TC	TOP OF CURB
+(74.50)	EXISTING SPOT GRADE, TYP.	BW	BOTTOM OF WALL
X%	SLOPE, TYP.	TW	TOP OF WALL
	APPROXIMATE TOP OF BANK	BOS	BOTTOM OF STAIR
	100' RESOURCE BUFFER	TOS	TOP OF STAIR
	200' RIVERFRONT AREA	RIM	CATCH BASIN RIM

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO.	REVISION	DATE

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100% DESIGN DEVELOPMENT SET

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Scale: 1"=40'-0"
Drawing Title:

GRADING PLAN

L3.5

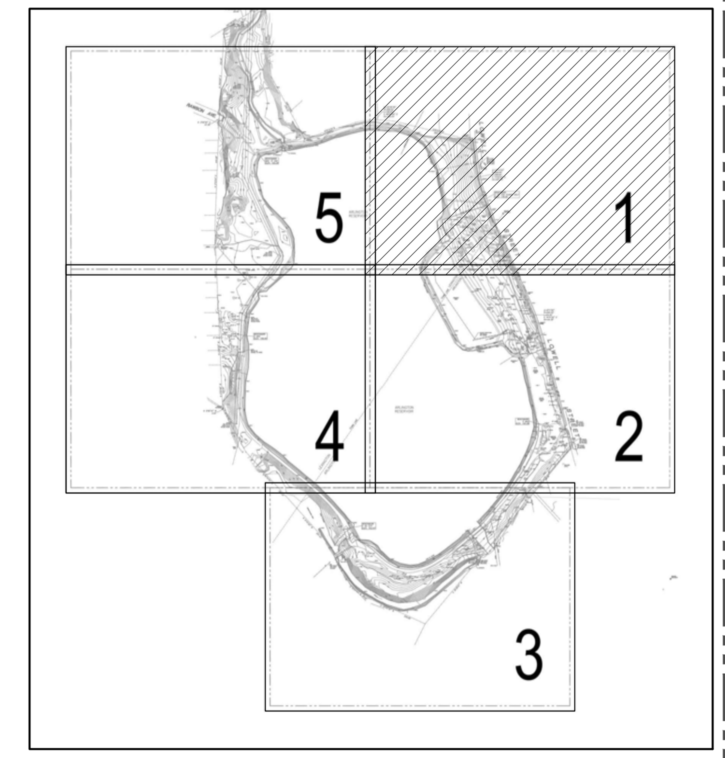
LEGEND

L.O.W.	LIMIT OF WORK
	EXISTING TREE
	DECIDUOUS TREE 7 LD1.9
	EVERGREEN TREE 8 LD1.9
	SHRUB PLANTING 6 LD1.9
	PERENNIAL PLANTING 5 LD1.9
	SEEDING 4 LD1.9
	APPROXIMATE TOP OF BANK
	100' TOP OF BANK BUFFER
	200' RIVERFRONT AREA

** SEE SHEET L4.2A FOR PLANT SCHEDULE-BEACH & PLAYGROUND AREA
SEE SHEET L4.4 FOR PLANT SCHEDULE-TRAIL AREA A AND B

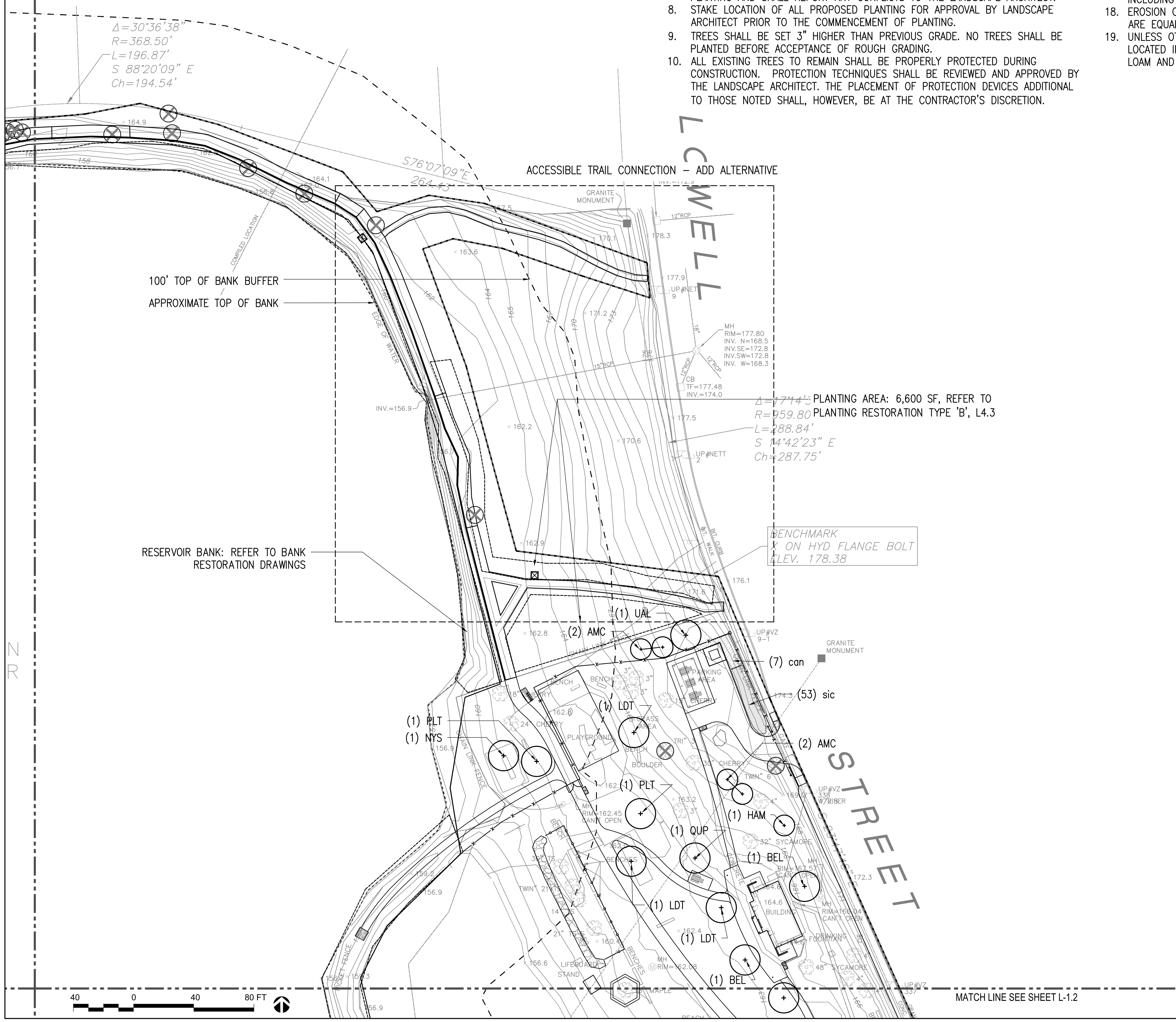
PLANTING NOTES:

1. IF DISCREPANCIES EXIST BETWEEN THE NUMBER OF PLANTS DRAWN ON THE PLANTING PLAN AND THE NUMBER OF PLANTS IN THE PLANT LIST, THE PLANTING PLAN SHALL GOVERN.
2. ALL NEW PLANT MATERIAL SHALL CONFORM TO THE MINIMUM GUIDELINES ESTABLISHED FOR NURSERY STOCK PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN, INC. IN ADDITION, ALL NEW PLANT MATERIAL FOR THE PROJECT SHALL BE OF SPECIMEN QUALITY.
3. ALL NEW PLANTS TO BE BALLED AND BURLAPPED OR CONTAINER-GROWN, UNLESS OTHERWISE NOTED ON THE PLANT SCHEDULE.
4. THE CONTRACTOR SHALL SUPPLY ALL NEW PLANT MATERIAL IN QUANTITIES SUFFICIENT TO COMPLETE THE PLANTING SHOWN ON THE DRAWINGS.
5. ANY PROPOSED SUBSTITUTIONS OF PLANT SPECIES SHALL BE MADE WITH PLANTS OF EQUIVALENT OVERALL FORM, HEIGHT, BRANCHING HABIT, FLOWER, LEAF, COLOR, FRUIT AND CULTURE, AND SHALL BE NATIVE PLANTS ON THE OLMSTED PLANTING LIST. ALL SUBSTITUTIONS SHALL REQUIRE WRITTEN APPROVAL OF THE LANDSCAPE ARCHITECT.
6. ALL NEW PLANTS SHALL BE TAGGED AND APPROVED BY THE LANDSCAPE ARCHITECT AT THE NURSERY PRIOR TO DIGGING OR DELIVERY TO THE SITE.
7. CONTRACTOR SHALL LOCATE AND VERIFY ALL EXISTING UTILITY LINES PRIOR TO PLANTING AND SHALL REPORT ANY CONFLICTS TO THE LANDSCAPE ARCHITECT.
8. STAKE LOCATION OF ALL PROPOSED PLANTING FOR APPROVAL BY LANDSCAPE ARCHITECT PRIOR TO THE COMMENCEMENT OF PLANTING.
9. TREES SHALL BE SET 3" HIGHER THAN PREVIOUS GRADE. NO TREES SHALL BE PLANTED BEFORE ACCEPTANCE OF ROUGH GRADING.
10. ALL EXISTING TREES TO REMAIN SHALL BE PROPERLY PROTECTED DURING CONSTRUCTION. PROTECTION TECHNIQUES SHALL BE REVIEWED AND APPROVED BY THE LANDSCAPE ARCHITECT. THE PLACEMENT OF PROTECTION DEVICES ADDITIONAL TO THOSE NOTED SHALL, HOWEVER, BE AT THE CONTRACTOR'S DISCRETION.
11. CONTRACTOR SHALL PROVIDE FULL DEPTHS OF LOAM AS NOTED ON DETAILS AND AS SPECIFIED, FOR ALL PLANTING.
12. CONTRACTOR SHALL COORDINATE LOCATION OF ALL UTILITIES (LINES, DUCTS, CONDUITS, SLEEVES, FOOTINGS, ETC.) WITH LOCATIONS OF PROPOSED LANDSCAPE ELEMENTS (WALLS, FENCES, FOOTINGS, TREE ROOTBALLS, PROPOSED LIGHTING FOOTINGS, ETC.). CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT PRIOR TO CONTINUING WORK.
13. LIMIT OF WORK LINE IS NOTED ON DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGE DUE TO OPERATIONS INSIDE AND OUTSIDE OF THE CONTRACT LIMIT LINE. ANY AREA OUTSIDE THE LIMIT OF WORK THAT IS DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO ADDITIONAL COST TO THE OWNER.
14. IN AREAS WHERE EXISTING PAVEMENTS ARE REMOVED AND ARE PROPOSED AS LAWN, THE CONTRACTOR SHALL REMOVE THE PAVEMENT AND BASE, PROVIDE FILL AND 6" TOPSOIL PRIOR TO SEEDING.
15. CONTRACTOR SHALL PROVIDE PRUNING BY CERTIFIED ARBORIST. PRUNING SHALL BE REVIEWED WITH LANDSCAPE ARCHITECT PRIOR TO WORK.
16. ANY IDENTIFIED DEPRESSION SHALL BE FILLED WITH LOAM, SUFFICIENT TO ENSURE THAT SOIL IS LEVEL WITH SURROUNDING GRADE AFTER SETTLEMENT, AND SEEDED.
17. LOAM AND SEED ALL DISTURBED AREAS THAT ARE NOT PROPOSED AS PAVEMENT, INCLUDING AREAS OF INVASIVE REMOVAL AND STUMP REMOVAL.
18. EROSION CONTROL BLANKETS SHALL BE USED ON NEWLY GRADED SLOPES THAT ARE EQUAL TO OR STEEPER THAN A 3:1 SLOPE.
19. UNLESS OTHERWISE DESIGNATED, ALL INVASIVE MANAGEMENT AREAS, UNLESS LOCATED IN RIPRAP OR PROPOSED AS HARDSCAPE, SHALL BE TOP DRESSED WITH LOAM AND SEEDED.

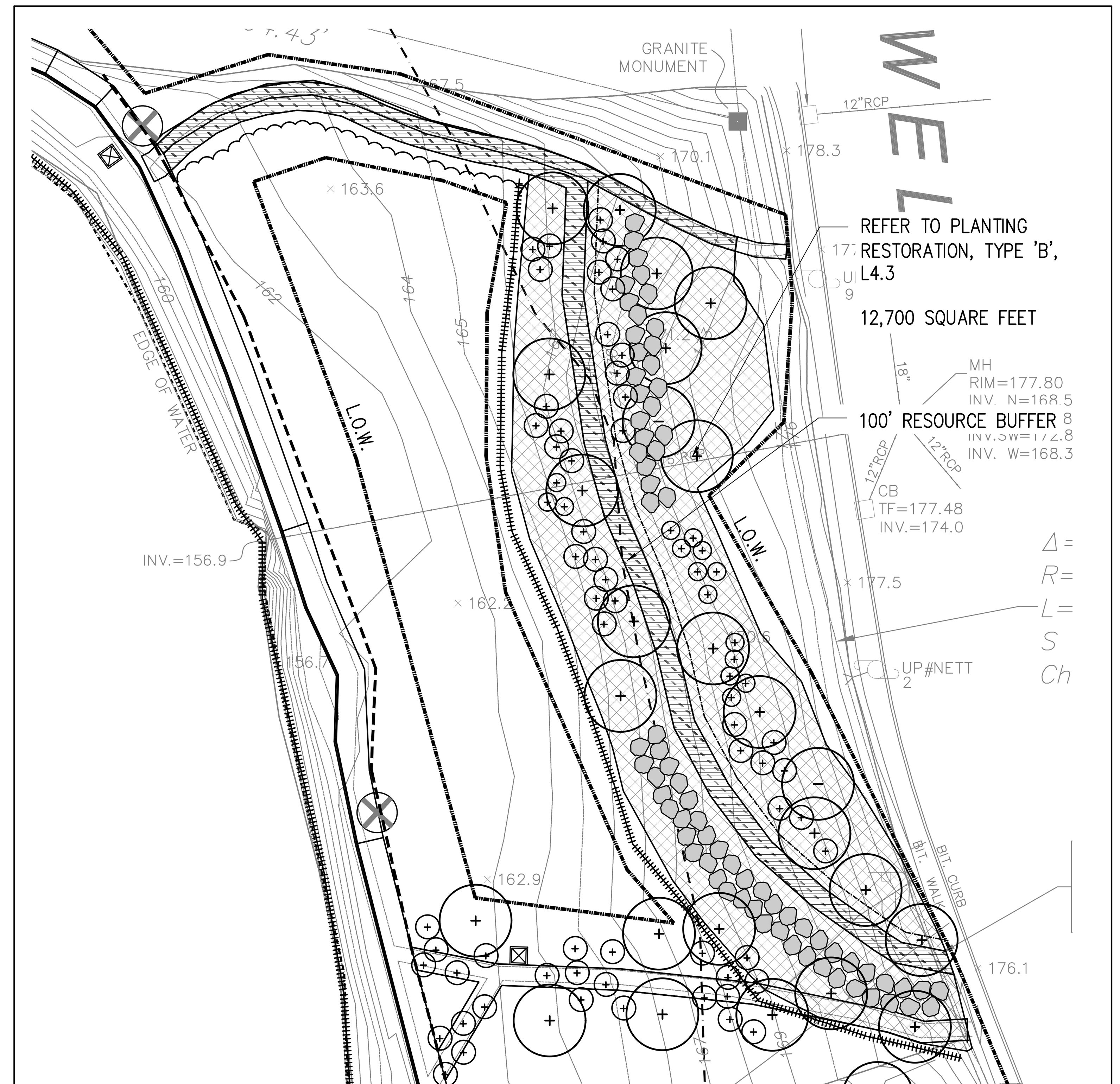


KEY PLAN

MATCH LINE SEE SHEET L-4.5



MATCH LINE SEE SHEET L-1.2



ACCESSIBLE TRAIL CONNECTION - ADD ALTERNATIVE
SCALE: 1" = 30'-0"

40 0 40 80 FT

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

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100% DESIGN DEVELOPMENT SET

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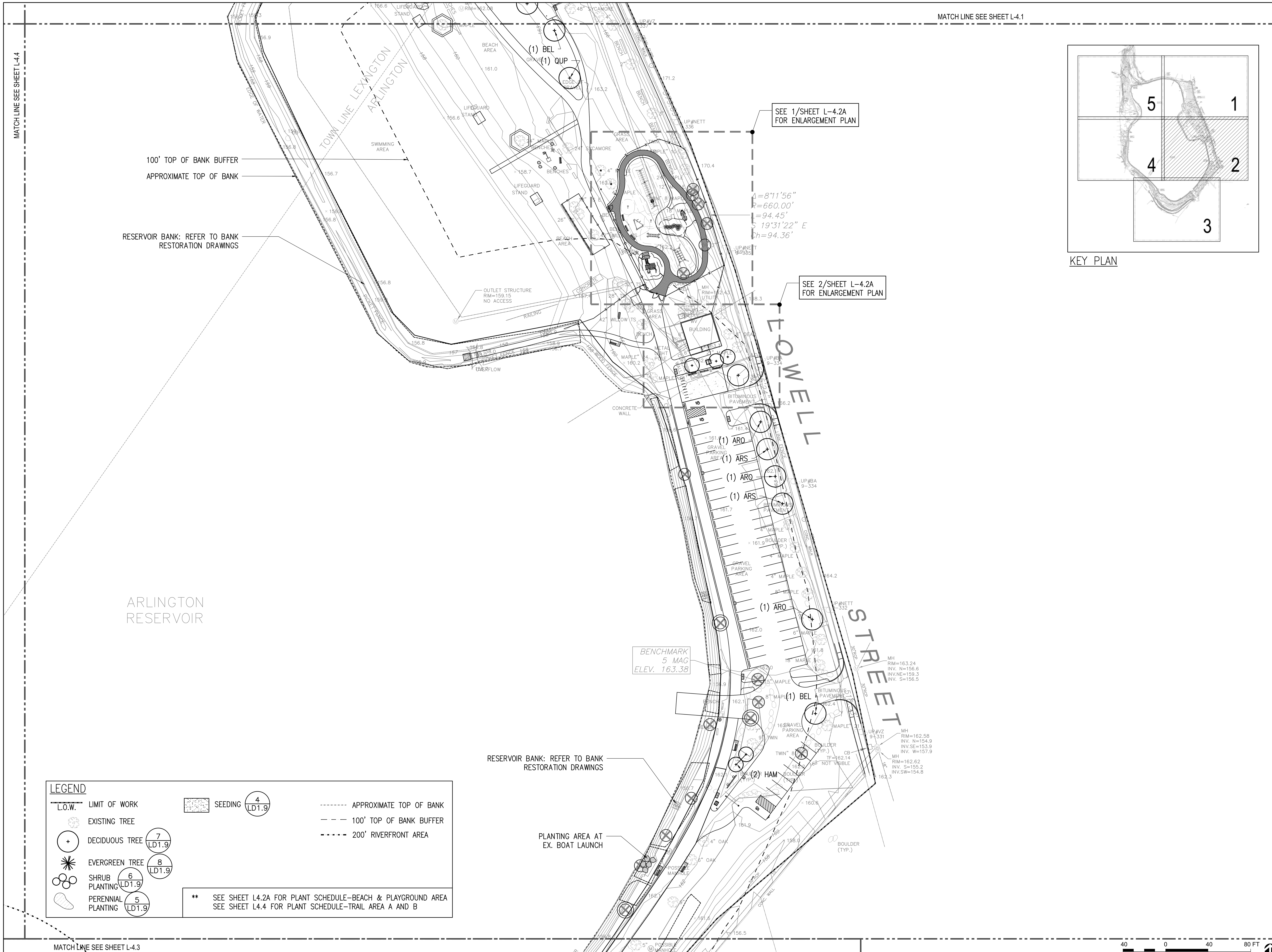
Drawing Title:

PLANTING PLAN

L4.1



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ARLINGTON, MASSACHUSETTS

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MASSACHUSETTS KYLE S. ZICK REGISTERED LANDSCAPE ARCHITECT

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Drawing Title:

PLANTING PLAN

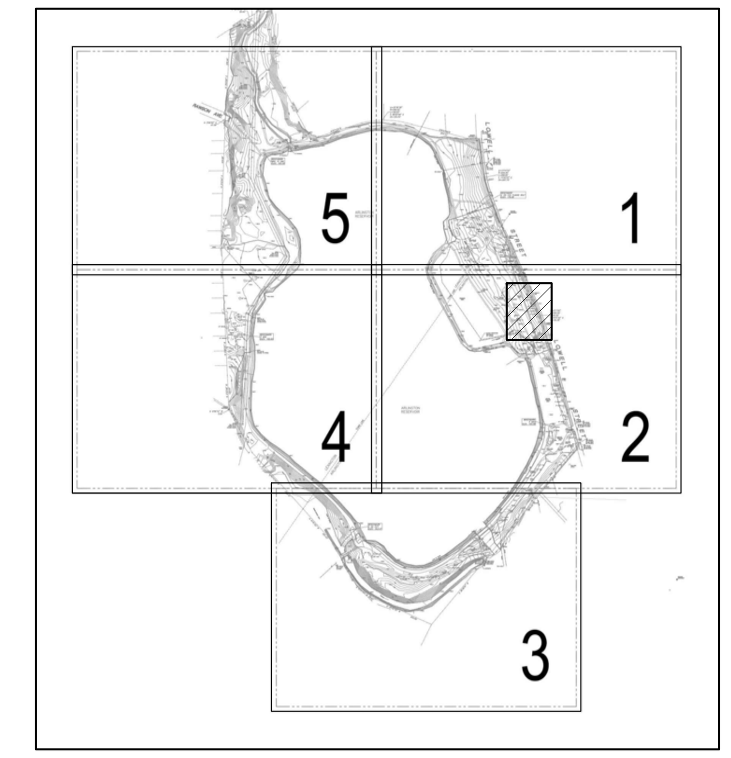
L4.2

1 ENLARGEMENT PLAN
SCALE: 1"=10'-0"

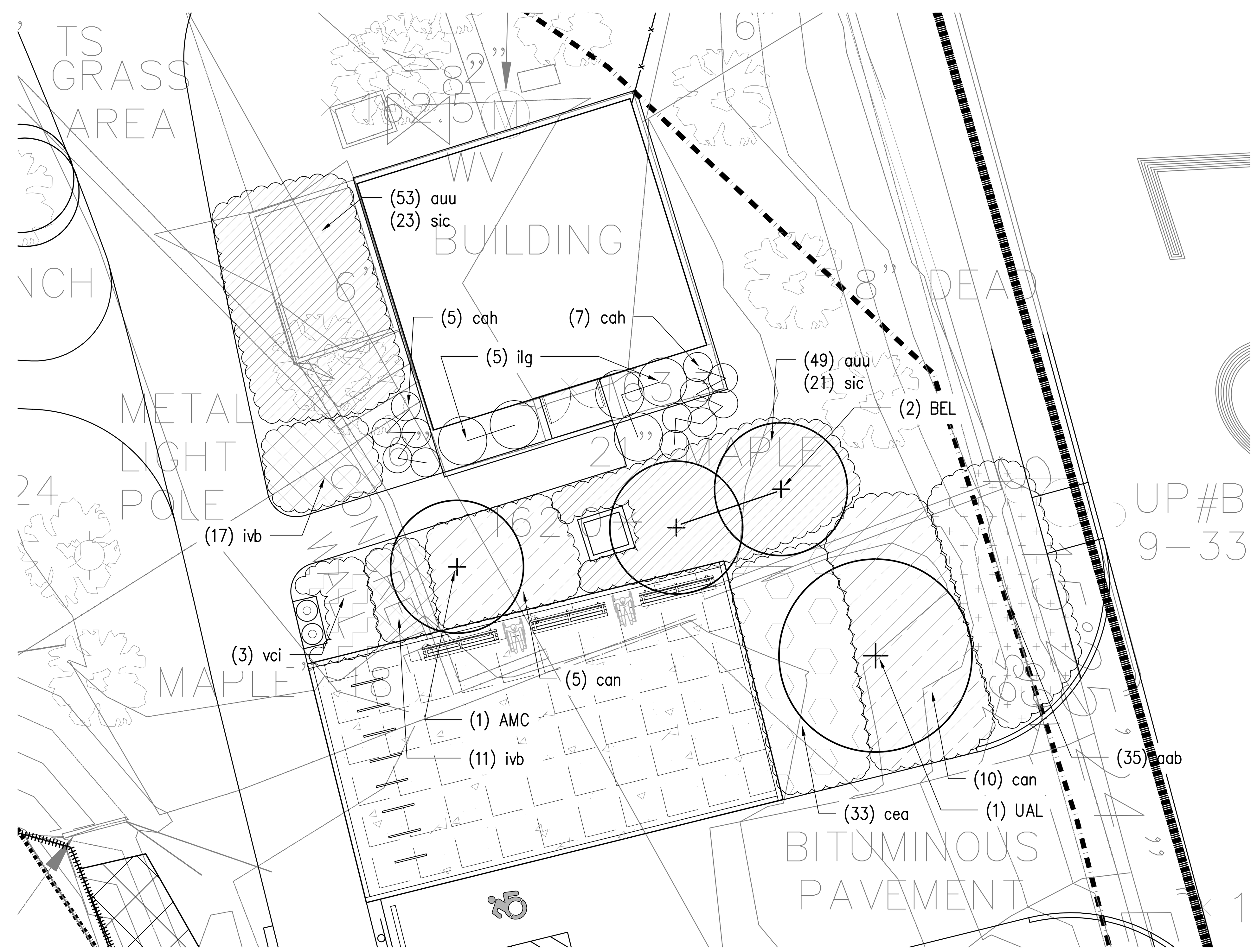
LEGEND

- L.O.W. LIMIT OF WORK
- EXISTING TREE
- DECIDUOUS TREE 7 LD1.9
- EVERGREEN TREE 8 LD1.9
- SHRUB PLANTING 6 LD1.9
- PERENNIAL PLANTING 5 LD1.9
- SEEDING 4 LD1.9
- APPROXIMATE TOP OF BANK
- 100' TOP OF BANK BUFFER
- 200' RIVERFRONT AREA

** SEE SHEET L4.2A FOR PLANT SCHEDULE-BEACH & PLAYGROUND AREA
SEE SHEET L4.4 FOR PLANT SCHEDULE-TRAIL AREA A AND B



KEY PLAN



2 ENLARGEMENT PLAN
SCALE: 1"=10'-0"

PLANT SCHEDULE

KEY	QTY.	BOTANICAL NAME	COMMON NAME	SIZE
		DECIDUOUS TREES		
AMC	5	AMENLANCHIER CANADENSIS	SERVICEBERRY	3" CAL.
ARS	3	ACER RUBRUM 'RED SUNSET'	RED MAPLE	3" CAL.
ARO	3	ACER RUBRUM 'OCTOBER GLORY'	RED MAPLE	3" CAL.
ASF	3	ACER SACCHARUM 'FALL FIESTA'	SUGAR MAPLE	3" CAL.
BEL	6	BETULA POPULIFOLIA	GRAY BIRCH	12' CLUMP
HAM	14	HAMAMELIS VIRGINIANA	WITCHHAZEL	8' CLUMP
LDT	3	LIRIODENDRON TULIPIFERA	TULIPTREE	3" CAL.
NYS	1	NYSSA SYLVATICA	TUPELO	2.5" CAL.
PLT	2	PLATANUS OCCIDENTALIS	SYCAMORE	2.5" CAL.
QUP	2	QUERCUS PALUSTRIS	PIN OAK	3" CAL.
UAP	3	ULMUS AMERICANA 'PRINCETON'	PRINCETON ELM	2.5" CAL.
UAL	2	ULMUS AMERICANA 'JEFFERESON'	AMERICAN ELM	3" CAL.

KEY	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	SPACING
		EVERGREEN TREES			
ACC	3	ABIES CONCOLOR	WHITE FIR	8-10' HT.	
		SHRUBS			
aab	35	ARONIA ARBUTIFOLIA 'BRILLIANTISSIMA'	RED CHOKEBERRY	5 GAL.	3'-0" O.C.
cah	12	CLETHRA ALNIFOLIA 'HUMMINGBIRD'	COMPACT SWEET PEPPERBUSH	5 GAL.	3'-0" O.C.
cea	33	CEANOTHUS AMERICANUS	NEW JERSEY TEA	5 GAL.	3'-0" O.C.
can	22	CORNUS AMOMUM	SILKY DOGWOOD	6 GAL.	6'-0" O.C.
ilg	5	ILEX GLABRA	INKBERRY	5 GAL.	5'-0" O.C.
ivb	28	ILEX VERTICILLATA 'BERRY POPPINS'	COMPACT WINTERBERRY	5 GAL.	2'-6" O.C.
vci	3	VIBURNUM CARLESII 'AURORA'	KOREANSPICE VIBURNUM	5 GAL.	5'-0" O.C.
		GROUNDCOVER			
auu	102	ARCTOSTAPHYLOS UVA-URSI	BEARBERRY	1 GAL.	24" O.C.
sic	97	STEPHANANDRA INCISA 'CRISPA'	CUTLEAF STEPHANANDRA	2 GAL.	36" O.C.

10 0 10 20 FT

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

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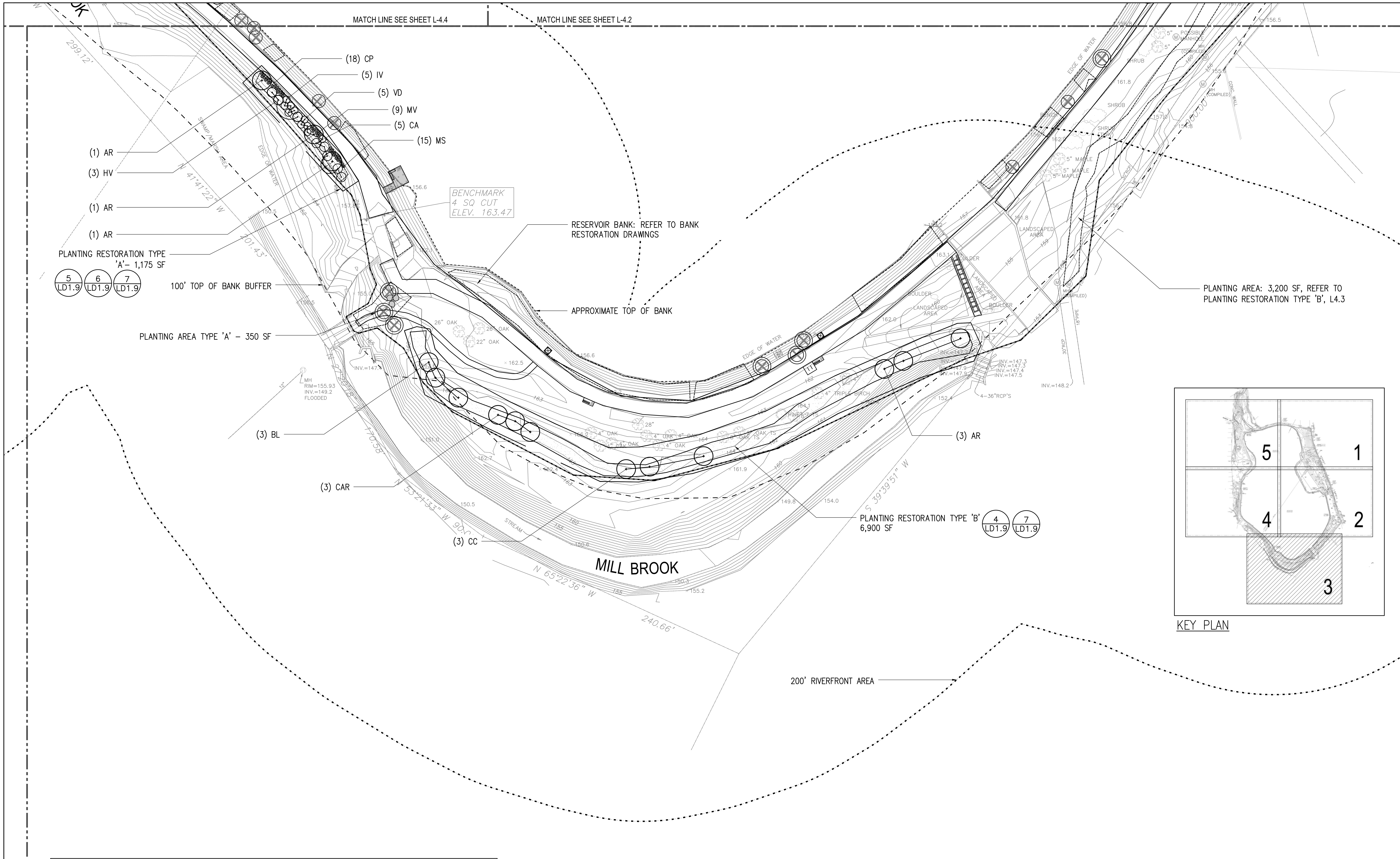
100% DESIGN DEVELOPMENT SET

Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB Checked By: KZ
Date: NOVEMBER 13, 2020
Scale: 1"=10'-0"
Drawing Title:

ENLARGED PLANTING PLAN

L4.2A



LEGEND

L.O.W.	LIMIT OF WORK
	EXISTING TREE
	DECIDUOUS TREE (7 LD1.9)
	EVERGREEN TREE (8 LD1.9)
	SHRUB PLANTING (6 LD1.9)
	PERENNIAL PLANTING (5 LD1.9)
	SEEDING (4 LD1.9)
	APPROXIMATE TOP OF BANK
	100' TOP OF BANK BUFFER
	200' RIVERFRONT AREA

** SEE SHEET L4.2A FOR PLANT SCHEDULE–BEACH & PLAYGROUND AREA
SEE SHEET L4.4 FOR PLANT SCHEDULE–TRAIL AREA A AND B

40 0 40 80 FT

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

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MASSACHUSETTS KYLE S. ZICK REGISTERED LANDSCAPE ARCHITECT

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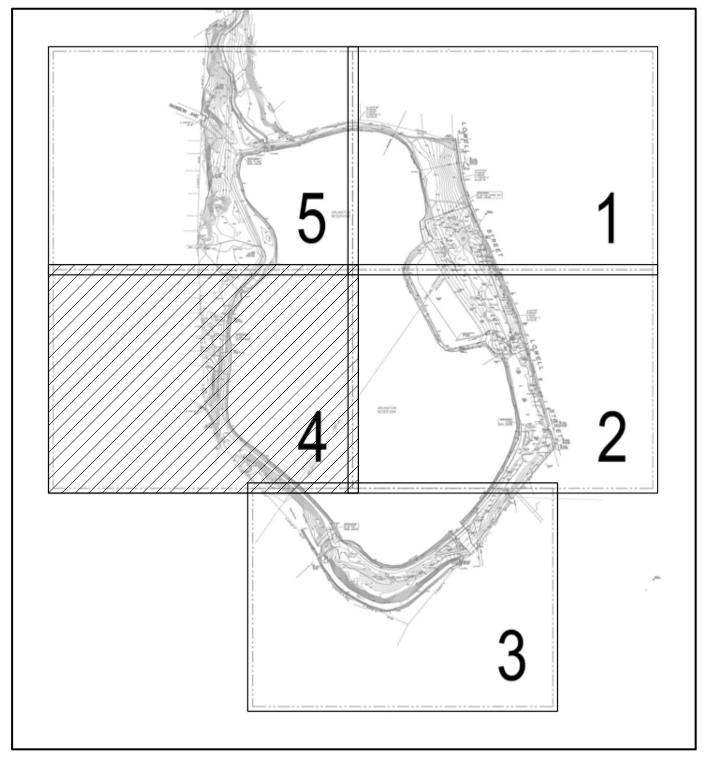
PLANTING PLAN

L4.3



KEY PLAN

PLANT SCHEDULE - Plant Restoration Type 'A'

KEY	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	SPACING
		TREES			
AR	3	ACER RUBRUM 'OCTOBER GLORY'	RED MAPLE	1.5" CAL.	
HV	3	HAMAMELIS VIRGINIANA	WITCHHAZEL	4-5' CLUMP	
		SHRUBS			
CA	5	CLETHRA ALNIFOLIA	SWEET PEPPERBUSH	5 GAL.	4'-6" O.C.
IV	5	ILEX VERTICILLATA 'BERRY POPPINS'	COMPACT WINTERBERRY	5 GAL.	2'-6" O.C.
VD	5	VIBURNUM DENTATUM 'BLUE MUFFIN'	COMPACT ARROWWOOD	5 GAL.	3'-0" O.C.
		PERENNIALS			
MV	9	MERTENSIA VIRGINICA	VIRGINIA BLUEBELLS	1 GAL.	12" O.C.
MS	15	MATTEUCCIA STRUTHIOPTERIS	OSTRICH FERN	1 GAL.	12" O.C.
CP	18	CAREX PENNSLYVANICA	PENSSYLVANIA SEDGE		

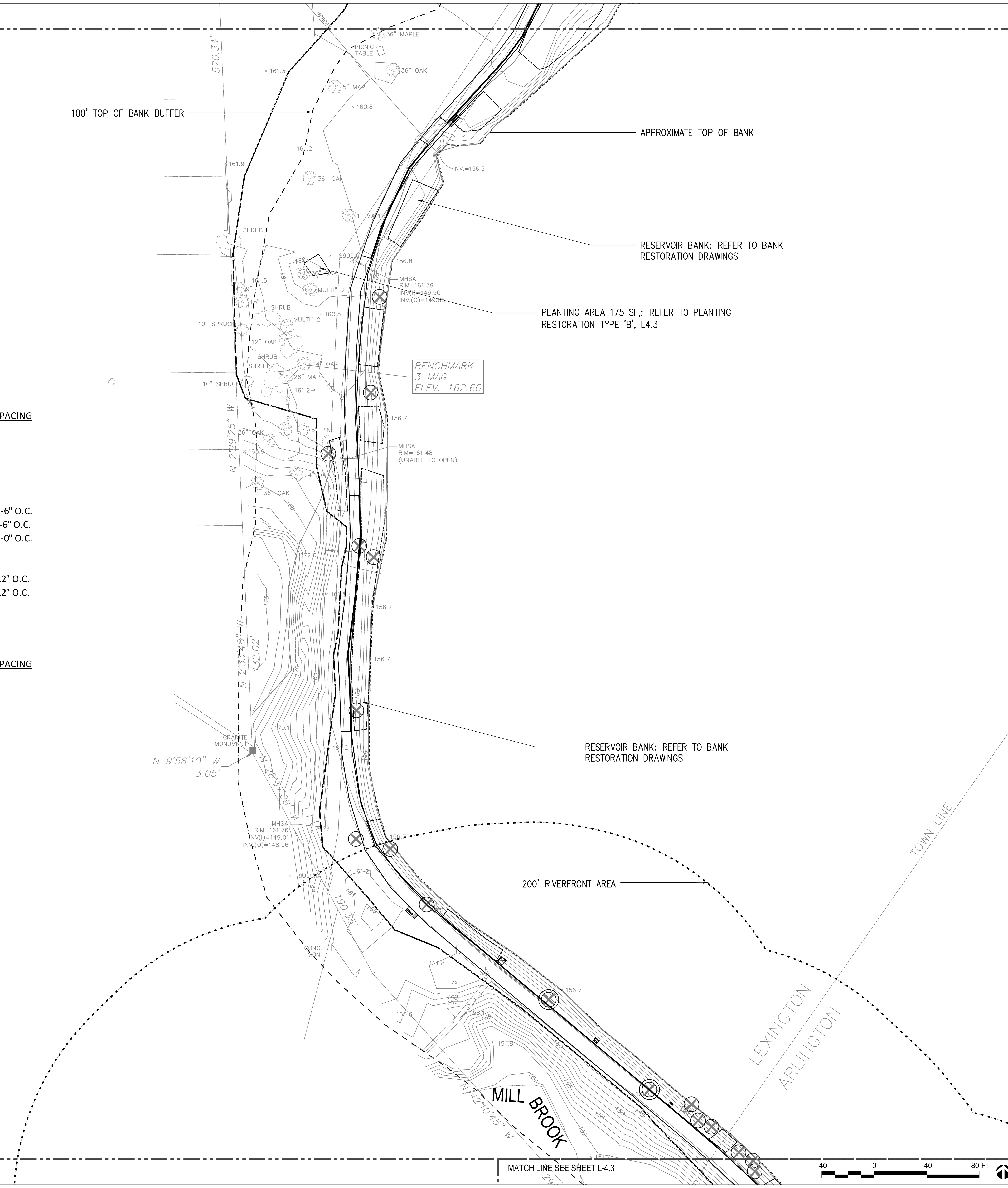
PLANT SCHEDULE - Plant Restoration Type 'B'

KEY	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	SPACING
		TREES			
AR	3	ACER RUBRUM 'OCTOBER GLORY'	RED MAPLE	1.5" CAL.	
BL	3	BETULA LENTA	SWEET BIRCH	8' CLUMP	
CC	3	CARPINUS CAROLINIANA	AMERICAN HORNBEAM	3" CAL.	
CAR	3	CERCIS CANADENSIS 'APPALANCHIAN RED'	REDBUD	3" CAL.	
		SEED			
	6900 SF	NATIVE PERENNIAL RESTORATION SEED MIX: REFER TO SPECS			

LEGEND

L.O.W. LIMIT OF WORK
EXISTING TREE
DECIDUOUS TREE 7 LD1.9
EVERGREEN TREE 8 LD1.9
SHRUB PLANTING 6 LD1.9
PERENNIAL PLANTING 5 LD1.9
SEEDING 4 LD1.9
APPROXIMATE TOP OF BANK
100' TOP OF BANK BUFFER
200' RIVERFRONT AREA

** SEE SHEET L4.2A FOR PLANT SCHEDULE–BEACH & PLAYGROUND AREA
SEE SHEET L4.4 FOR PLANT SCHEDULE–TRAIL AREA A AND B



ARLINGTON RESERVOIR - PHASE 2

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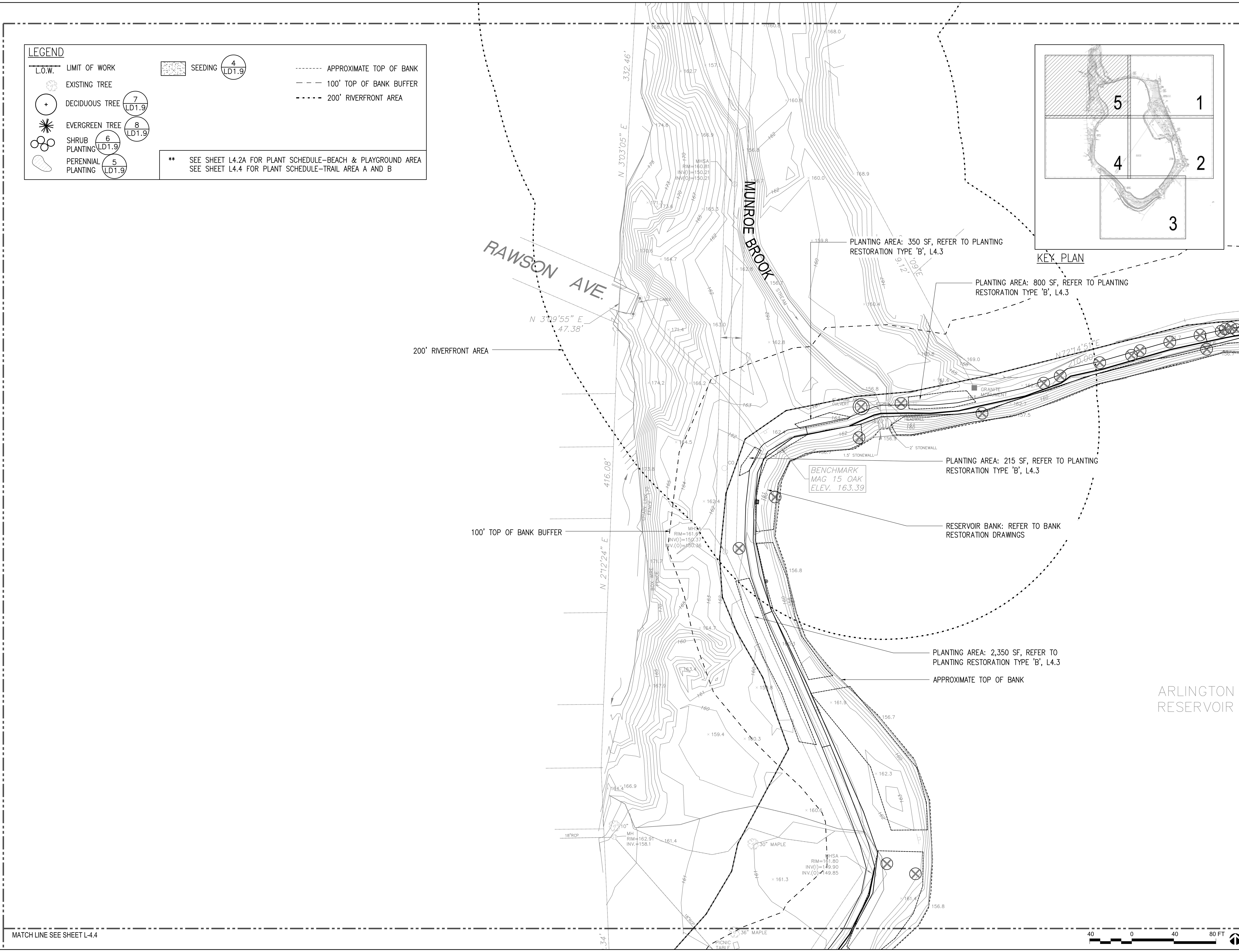
PLANTING PLAN

L4.4



ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

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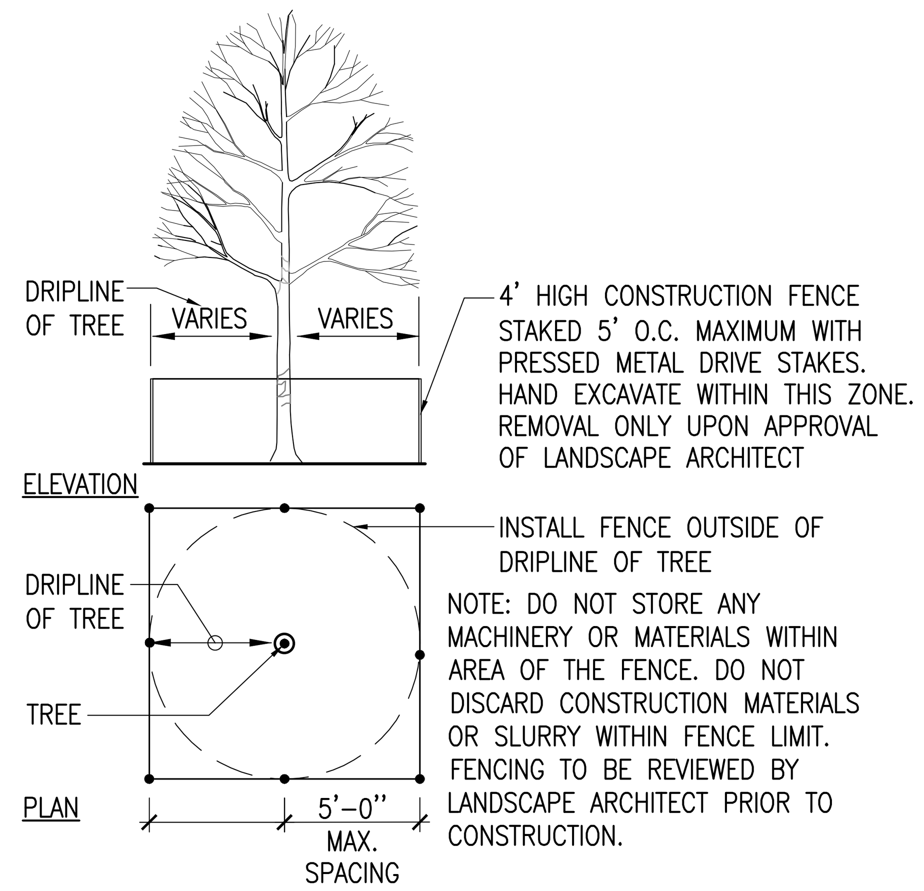
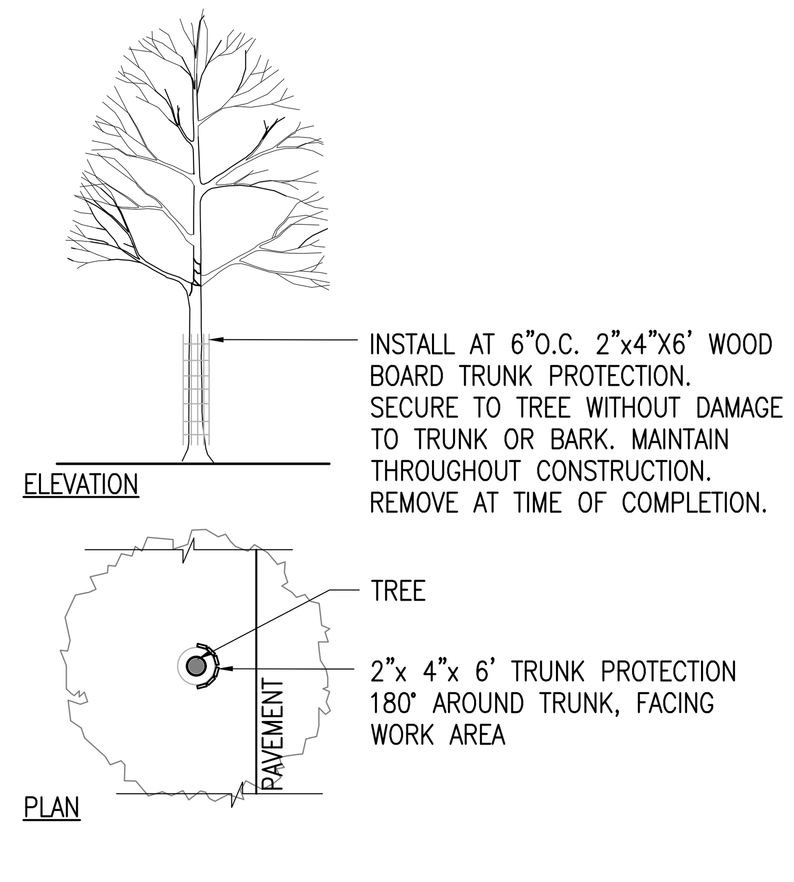
PLANTING PLAN

L4.5



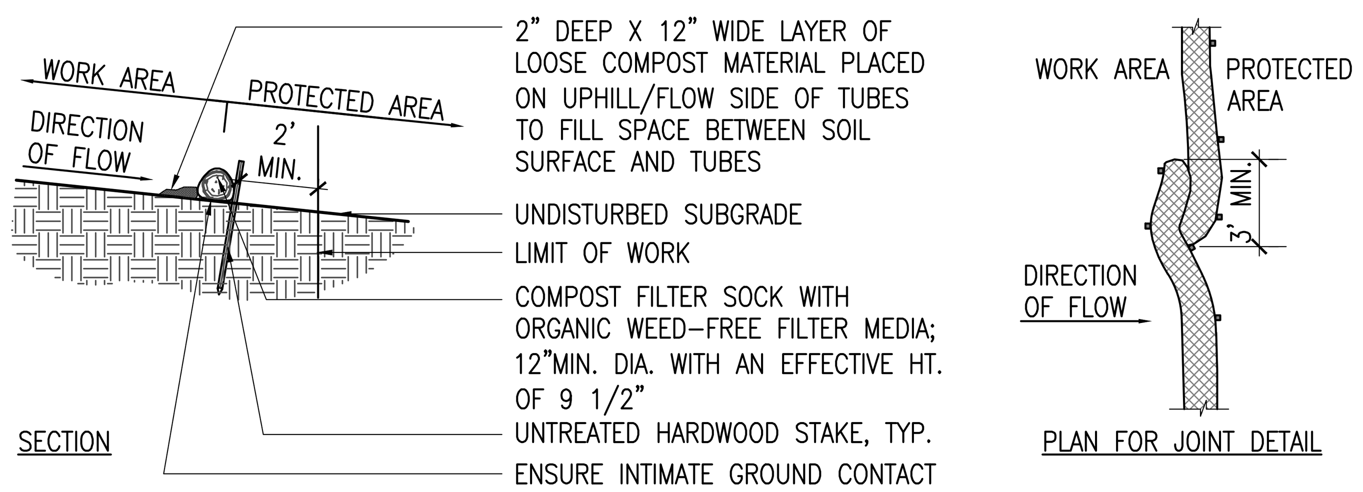
1 TREE PROTECTION - FENCE

SCALE: N.T.S.



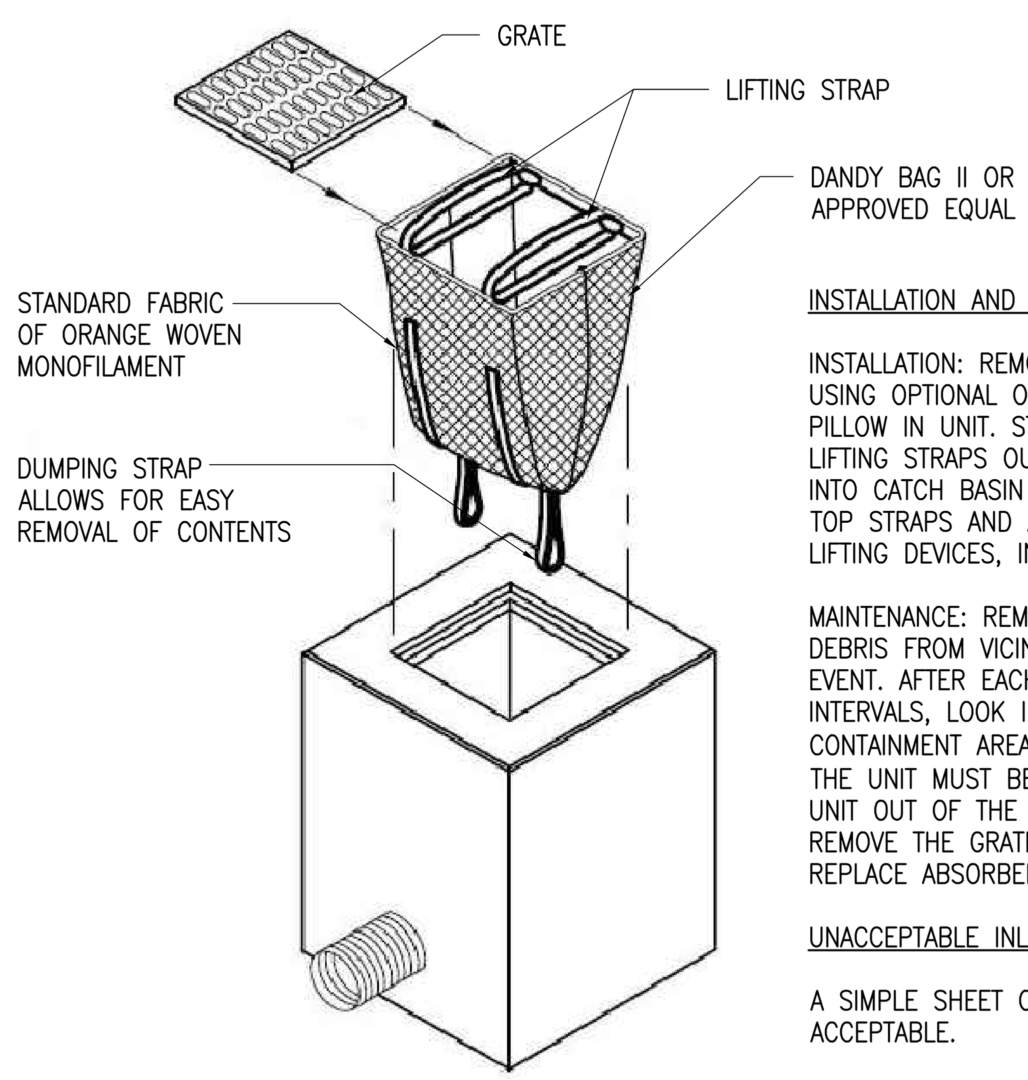
4 TREE PROTECTION - WOOD BOARD

SCALE: N.T.S.



2 EROSION CONTROL - COMPOST FILTER SOCK

SCALE: N.T.S.



INSTALLATION AND MAINTENANCE:

INSTALLATION: REMOVE THE GRATE FROM CATCH BASIN. IF USING OPTIONAL OIL ABSORBENTS; PLACE ABSORBENT PILLOW IN UNIT. STAND GRATE ON END. MOVE THE TOP LIFTING STRAPS OUT OF THE WAY AND PLACE THE GRATE INTO CATCH BASIN INSERT SO THE GRATE IS BELOW THE TOP STRAPS AND ABOVE THE LOWER STRAPS. HOLDING THE LIFTING DEVICES, INSERT THE GRATE INTO THE INLET.

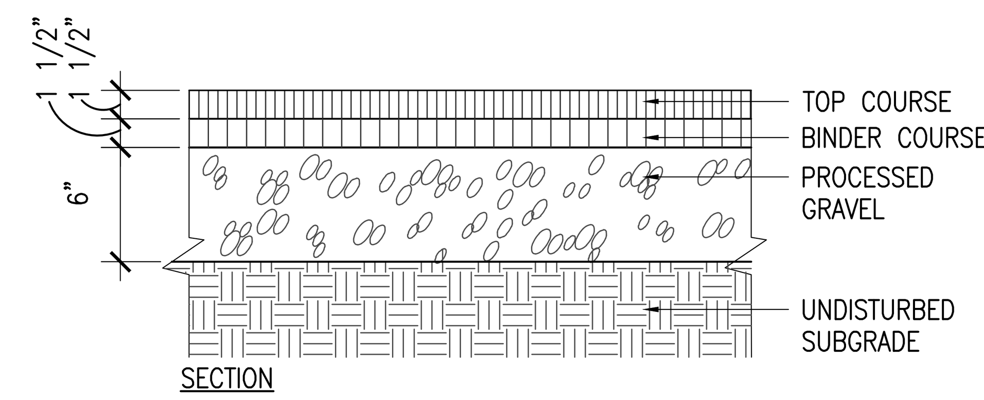
MAINTENANCE: REMOVE ALL ACCUMULATED SEDIMENT AND DEBRIS FROM VICINITY OF THE UNIT AFTER EACH STORM EVENT. AFTER EACH STORM EVENT AND AT REGULAR INTERVALS, LOOK INTO THE CATCH BASIN INSERT. IF THE CONTAINMENT AREA IS MORE THAN 1/3 FULL OF SEDIMENT, THE UNIT MUST BE EMPTIED. TO EMPTY THE UNIT, LIFT THE UNIT OUT OF THE INLET USING THE LIFTING STRAPS AND REMOVE THE GRATE. IF USING OPTIONAL ABSORBENTS; REPLACE ABSORBENT WHEN NEAR SATURAION.

UNACCEPTABLE INLET PROTECTION METHOD:

A SIMPLE SHEET OF GEOTEXTILE UNDER THE GRATE IS NOT ACCEPTABLE.

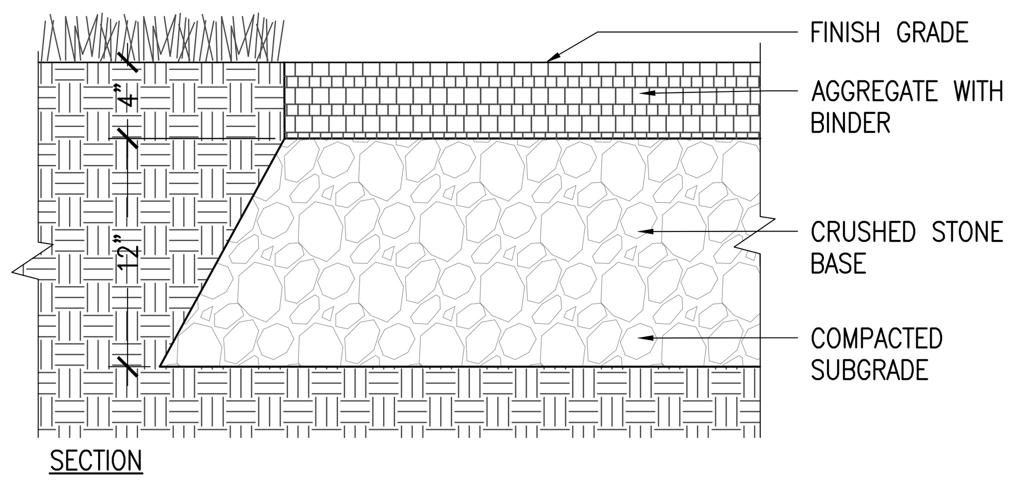
3 SILT SACK

SCALE: N.T.S.



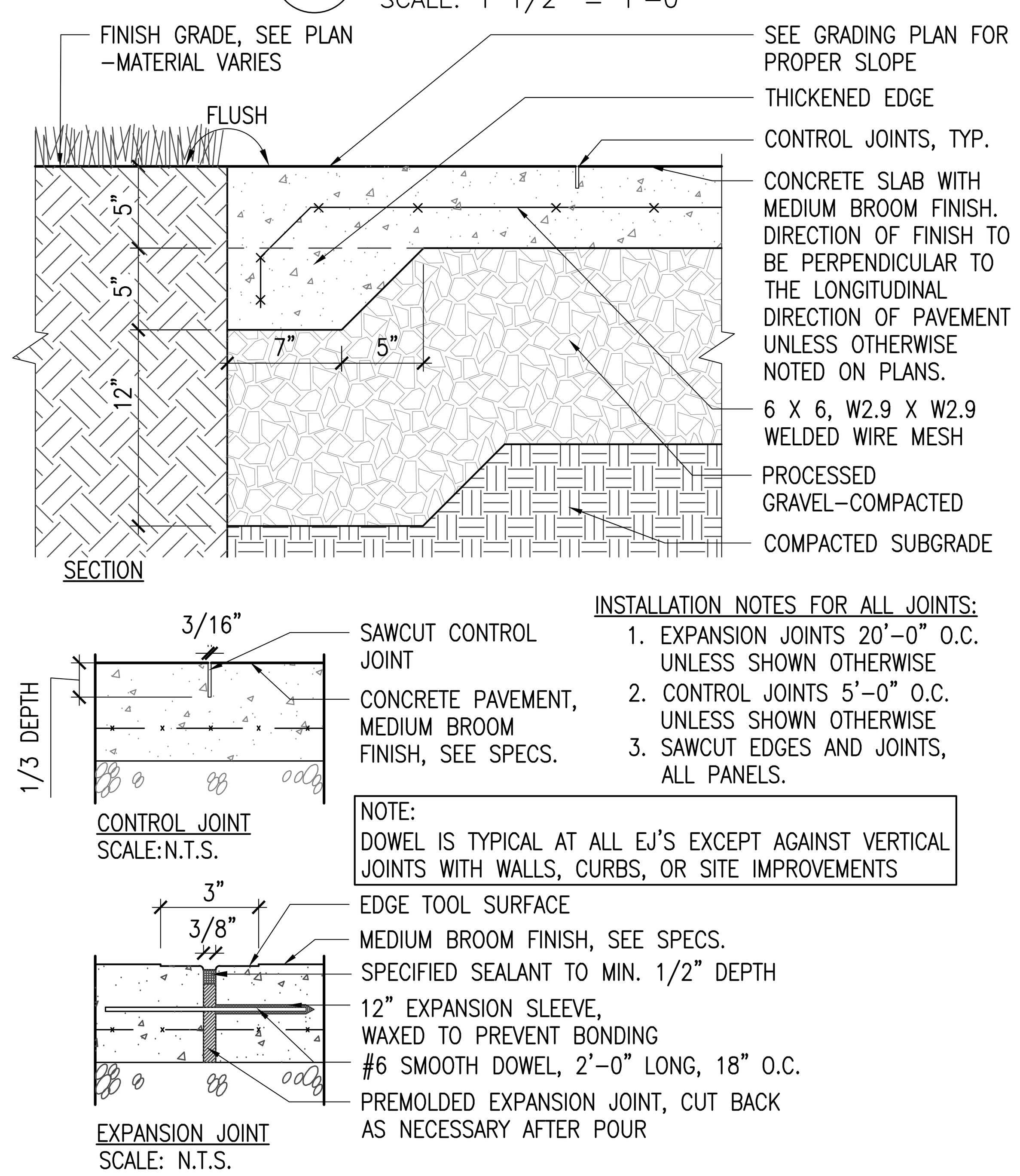
7 PEDESTRIAN ASPHALT

SCALE: 1 1/2" = 1'-0"



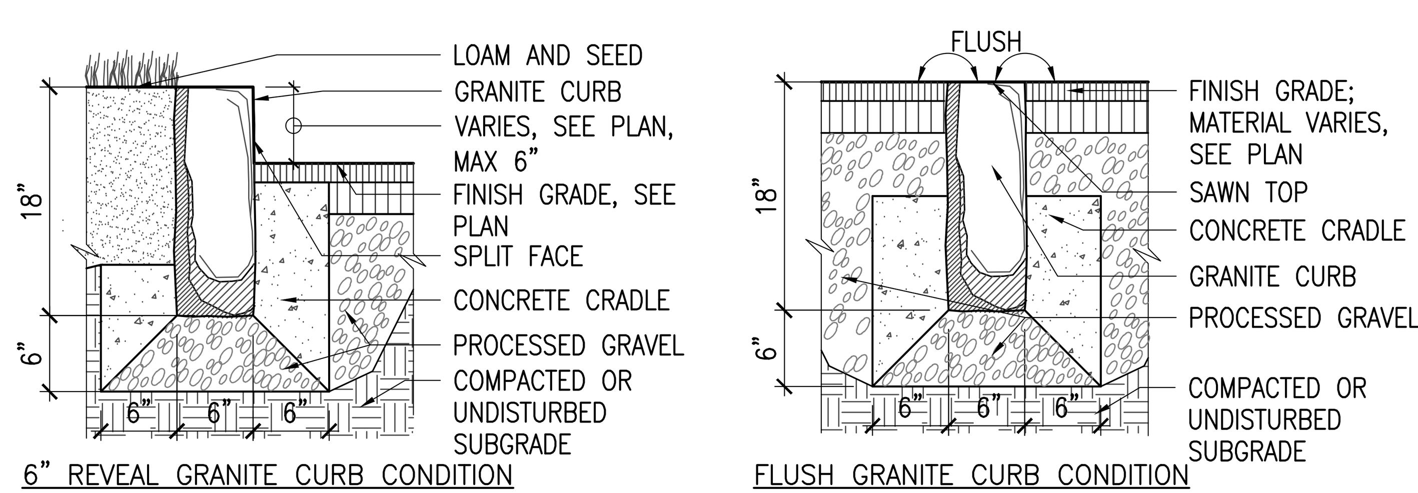
8 POROUS PAVEMENT

SCALE: 1 1/2" = 1'-0"



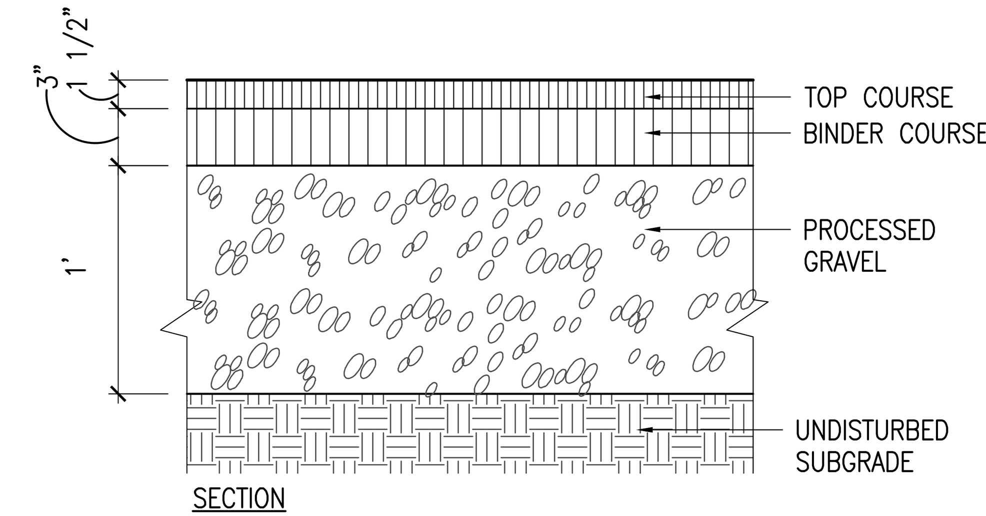
5 CONCRETE PAVEMENT

SCALE: 1 1/2" = 1'-0"



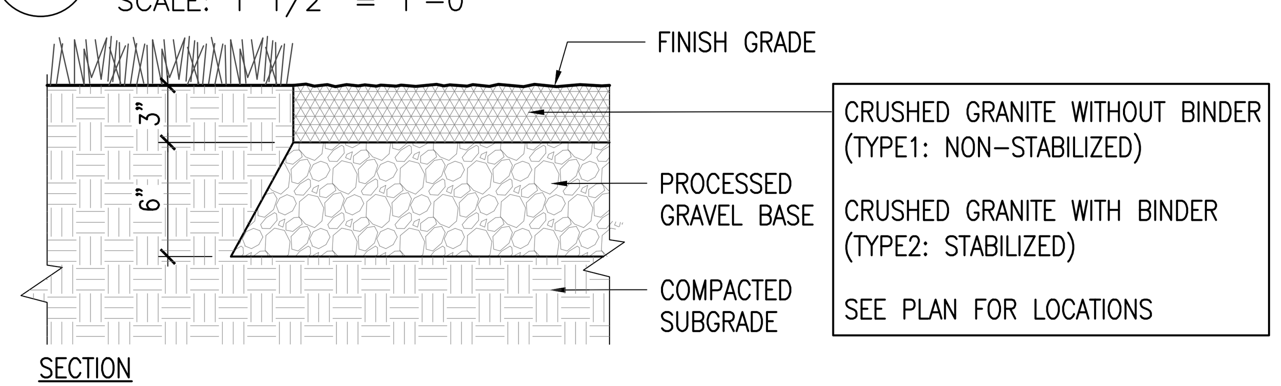
6 GRANITE CURB

SCALE: 1" = 1'-0"



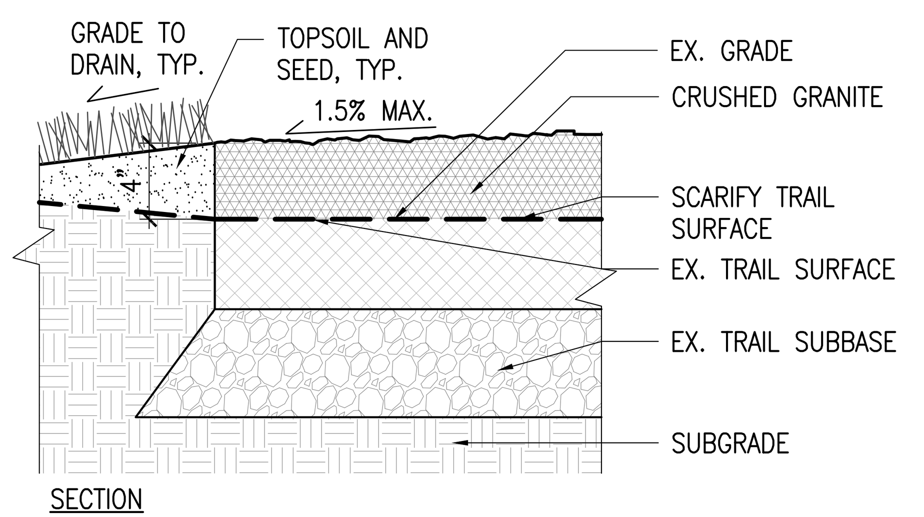
9 VEHICULAR ASPHALT

SCALE: 1 1/2" = 1'-0"



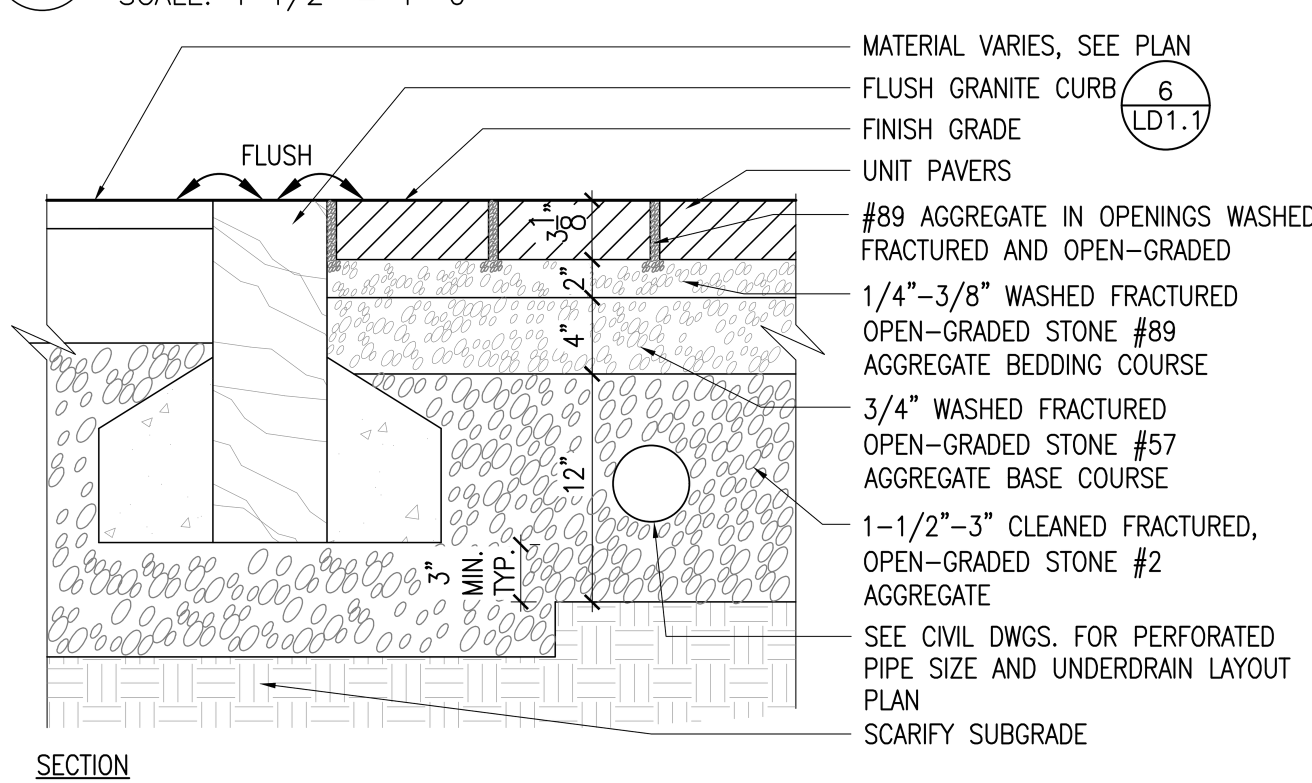
10 CRUSHED GRANITE PAVEMENT

SCALE: 1 1/2" = 1'-0"



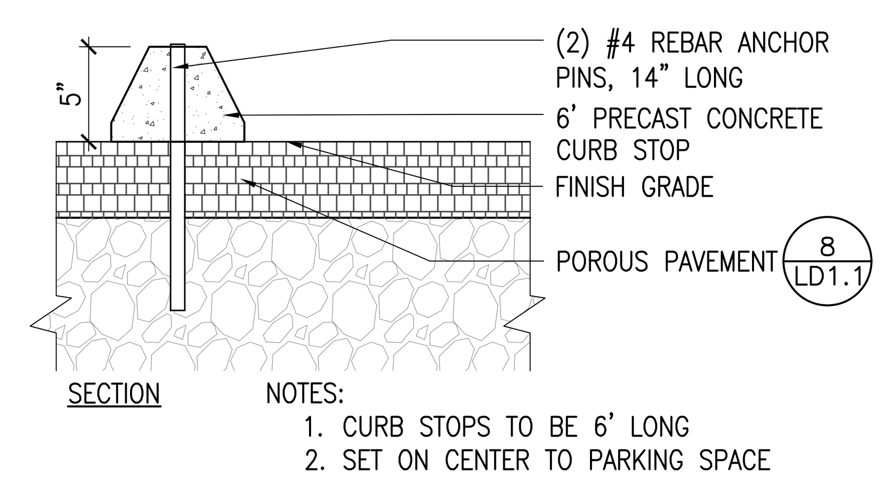
11 RESTORE EXISTING STONEDUST TRAIL

SCALE: 1 1/2" = 1'-0"



12 PERMEABLE CONCRETE UNIT PAVER

SCALE: 1 1/2" = 1'-0"



NOTES:
1. CURB STOPS TO BE 6' LONG
2. SET ON CENTER TO PARKING SPACE

13 CONCRETE CURB STOP

SCALE: 1 1/2" = 1'-0"

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO.	REVISION	DATE

kzla
Kyle Zick Landscape Architecture, Inc.
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www.kylezick.com

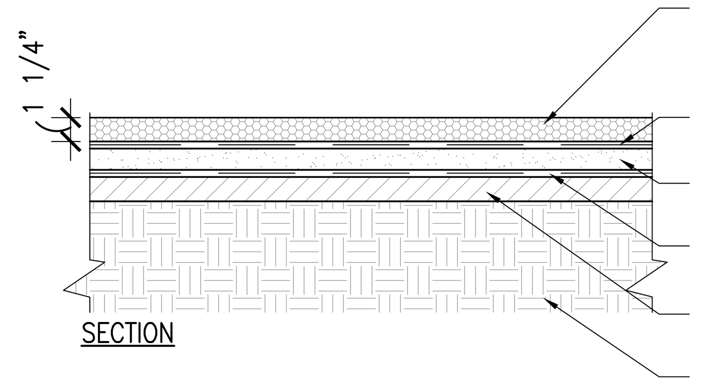
MASSACHUSETTS KYLE S. ZICK REGISTERED LANDSCAPE ARCHITECT

100% DESIGN DEVELOPMENT SET

Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB | Checked By: KZ
Date: NOVEMBER 13, 2020
Scale: AS SHOWN
Drawing Title:

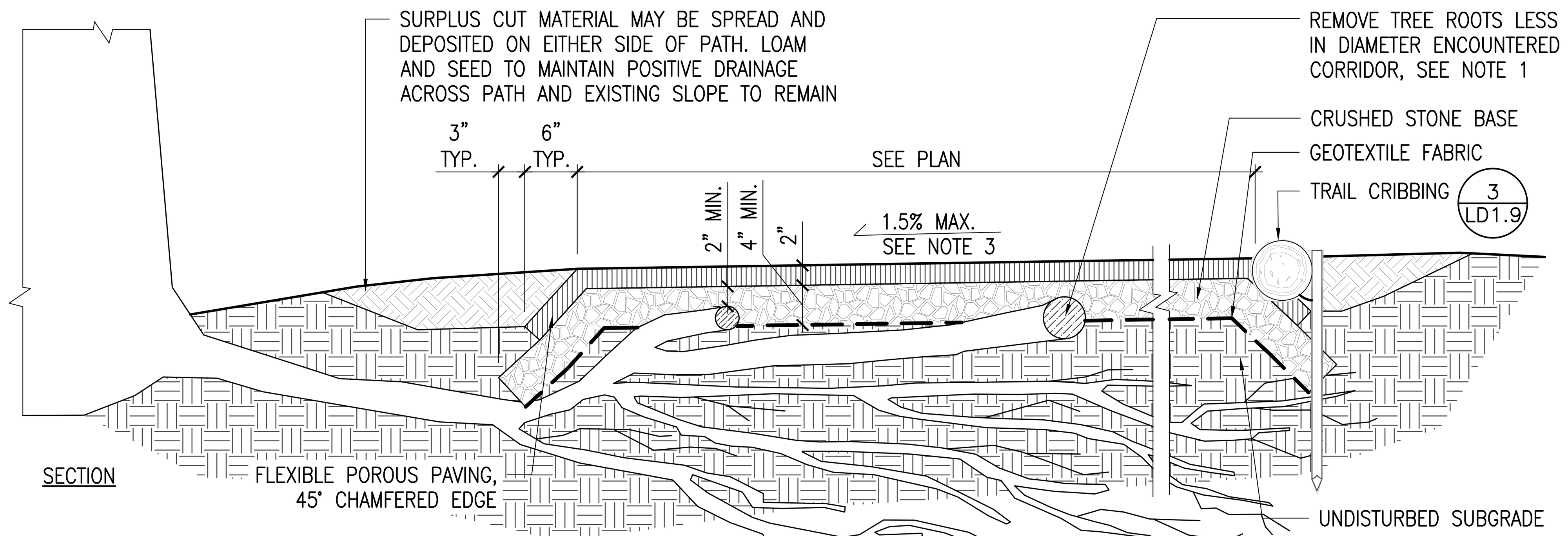
DETAILS

LD1.1



1 PERMEABLE ATHLETIC COURT SURFACING

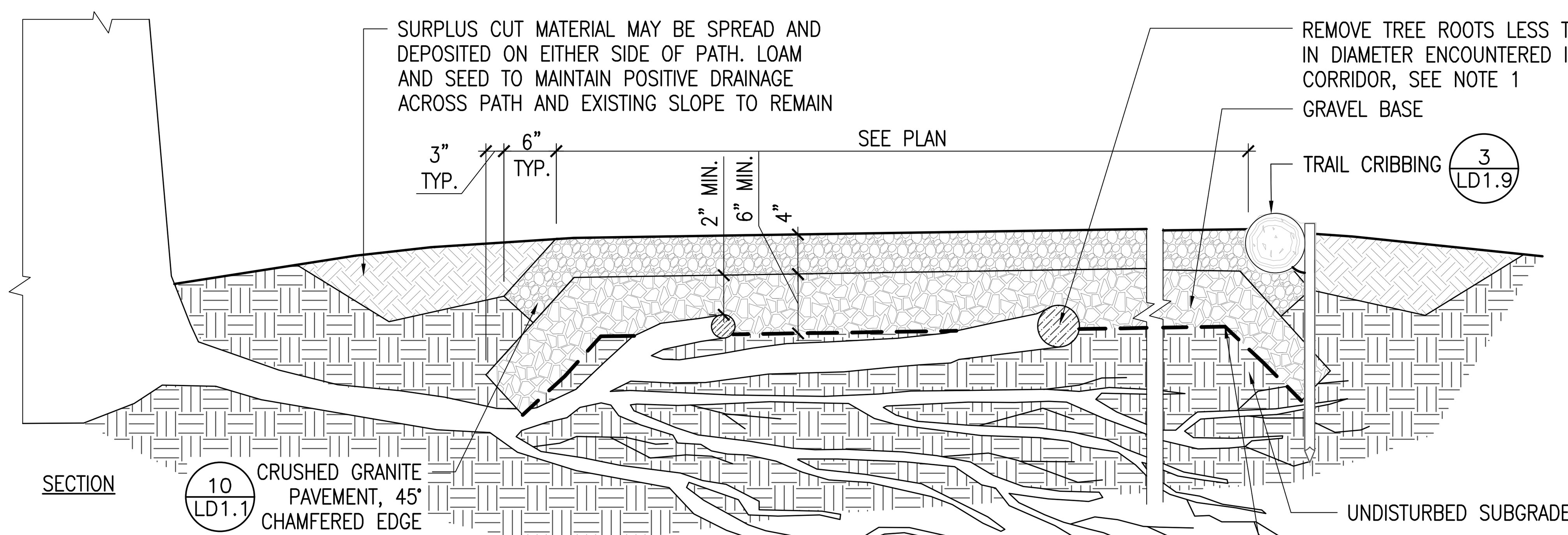
SCALE: 1 1/2" = 1'-0"



NOTE:
1. TO PREVENT INJURY TO CRITICAL ROOT ZONES OF ADJACENT TREES, SOIL IS TO BE EXCAVATED NON-INVASIVELY A MINIMUM OF 6 INCHES USING SUPERSONIC AIR KNIFE. FABRIC AND STONE ARE TO BE INSTALLED OVER AND AROUND ROOTS. SUBGRADE SHALL BE COMPACTED TO THE GREATEST EXTENT POSSIBLE. ROOT PRUNING MAY BE PERFORMED BY ARBORIST AS NEEDED ON SELECTED ROOTS LESS THAN 2 INCHES IN DIAMETER PROVIDED NO MORE THAN 15% OF THE CRITICAL ROOT ZONE IS REMOVED.
2. WHEREVER POSSIBLE, AND WITHOUT INJURING CRITICAL ROOT ZONES OF ADJACENT TREES. CRUSHED STONE BASE SHALL RUN 6 INCHES BEYOND THE END OF THE FLEXIBLE POROUS PAVING. AT LEAST 2" OF STONE SHALL COVER THE TOP OF ROOTS BEFORE FLEXIBLE POROUS MATERIAL IS LAID.
3. WALKWAY SHALL MAINTAIN A CROSS PITCH OF NOT MORE THAN ONE AND A HALF (1.5%) PERCENT. ANY DISCREPANCY NOT ALLOWING THIS TO OCCUR SHALL BE REPORTED TO LANDSCAPE ARCHITECT PRIOR TO CONTINUING WORK.

2 RUBBER SURFACING - TRAIL (ADD ALTERNATE)

SCALE: 1" = 1'-0"

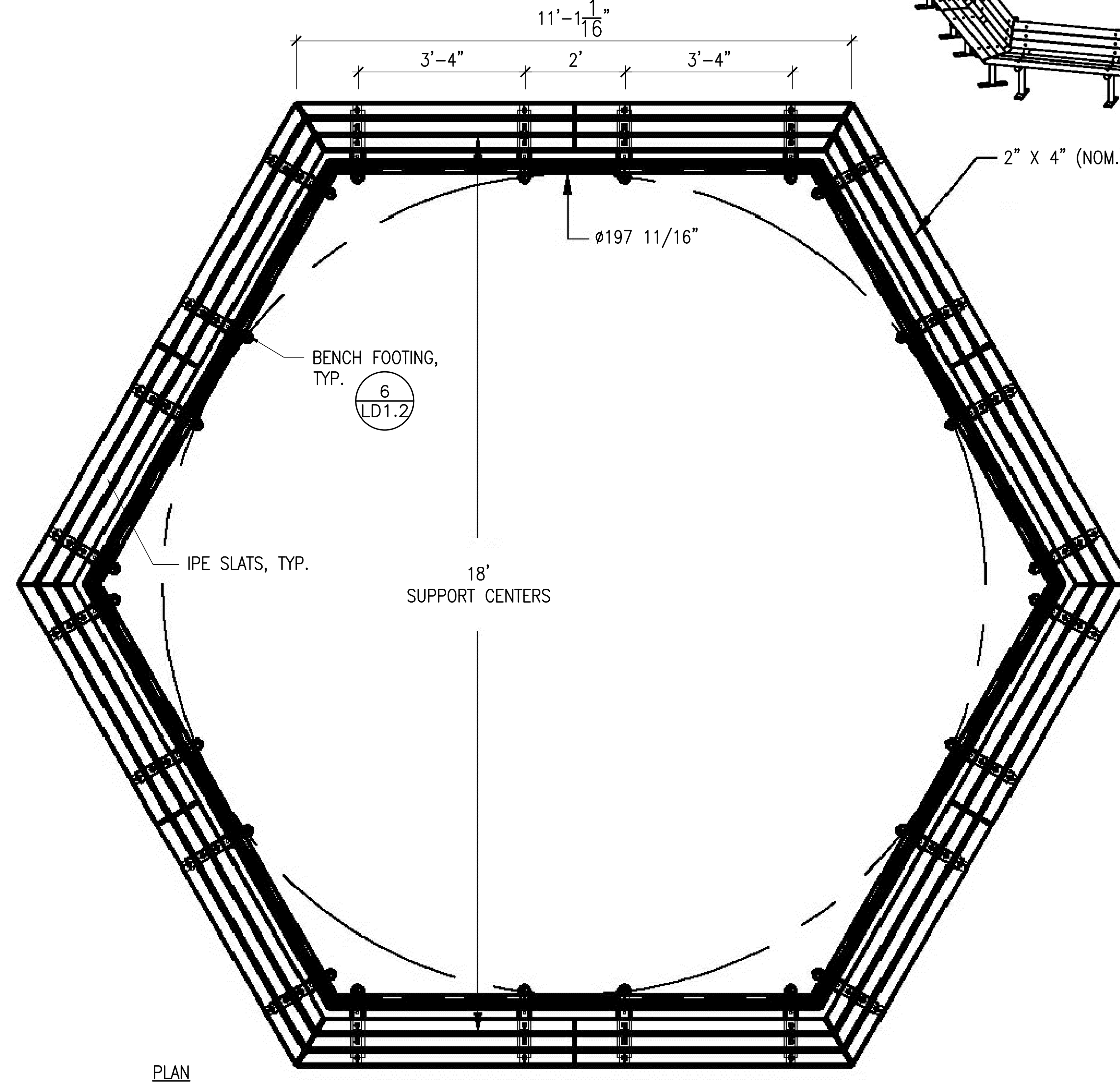


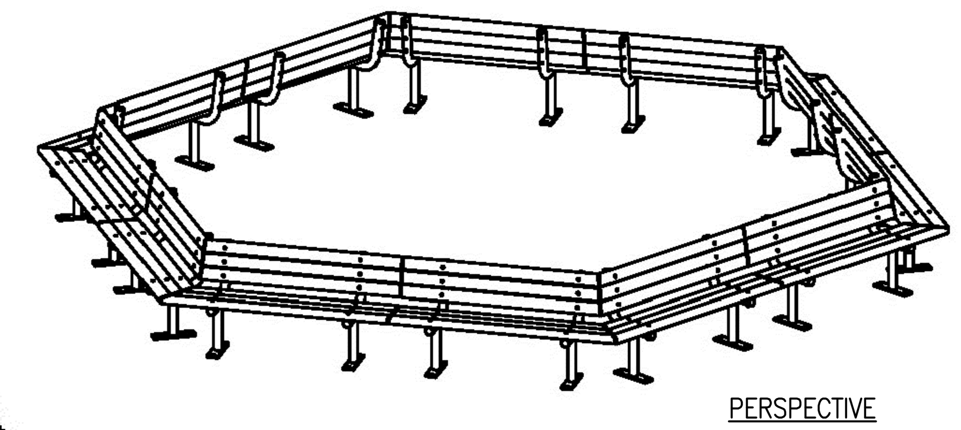
NOTE:
1. TO PREVENT INJURY TO CRITICAL ROOT ZONES OF ADJACENT TREES, SOIL IS TO BE EXCAVATED NON-INVASIVELY A MINIMUM OF 6 INCHES USING SUPERSONIC AIR KNIFE. FABRIC AND STONE ARE TO BE INSTALLED OVER AND AROUND ROOTS. SUBGRADE SHALL BE COMPACTED TO THE GREATEST EXTENT POSSIBLE. ROOT PRUNING MAY BE PERFORMED BY ARBORIST AS NEEDED ON SELECTED ROOTS LESS THAN 2 INCHES IN DIAMETER PROVIDED NO MORE THAN 15% OF THE CRITICAL ROOT ZONE IS REMOVED.
2. WHEREVER POSSIBLE, AND WITHOUT INJURING CRITICAL ROOT ZONES OF ADJACENT TREES. CRUSHED STONE BASE SHALL RUN 6 INCHES BEYOND THE END OF THE STONEDUST PAVING. AT LEAST 2" OF STONE SHALL COVER THE TOP OF ROOTS BEFORE STONEDUST PAVING IS LAID.
3. WALKWAY SHALL MAINTAIN A CROSS PITCH OF NOT MORE THAN ONE AND A HALF (1.5%) PERCENT. ANY DISCREPANCY NOT ALLOWING THIS TO OCCUR SHALL BE REPORTED TO LANDSCAPE ARCHITECT PRIOR TO CONTINUING WORK.

3 STABILIZED CRUSHED GRANITE PAVEMENT OVER TREE ROOTS

SCALE: 1" = 1'-0"

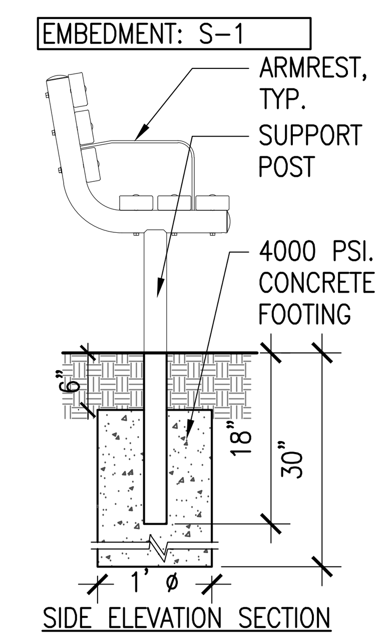
NOTE:
1. ALL STL. MEMBERS COATED W/ ZINC RICH EPOXY THEN FINISHED W/ POLYESTER POWDER COATING.
2. SEE SPECS. FOR COLOR INFO.
3. ALL BENCHES TO HAVE ARMRESTS.
4. ALL BENCHES TO HAVE IPE SLATS.





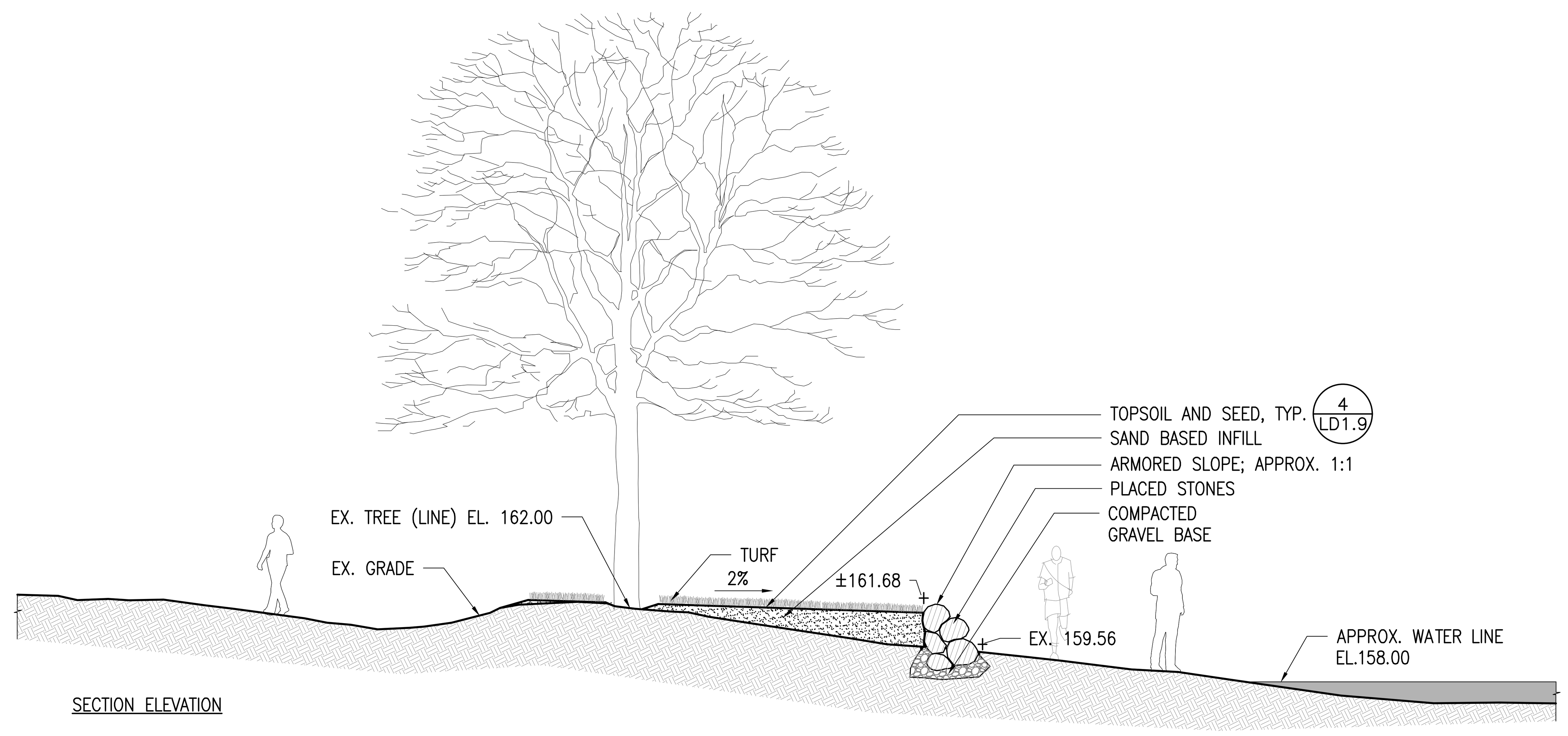
4 HEXAGONAL BENCH

SCALE: 1/2" = 1'-0"



6 BENCH FOOTING

SCALE: 3/4" = 1'-0"



5 ARMORED SLOPE AT BEACH

SCALE: 3/16" = 1'-0"

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

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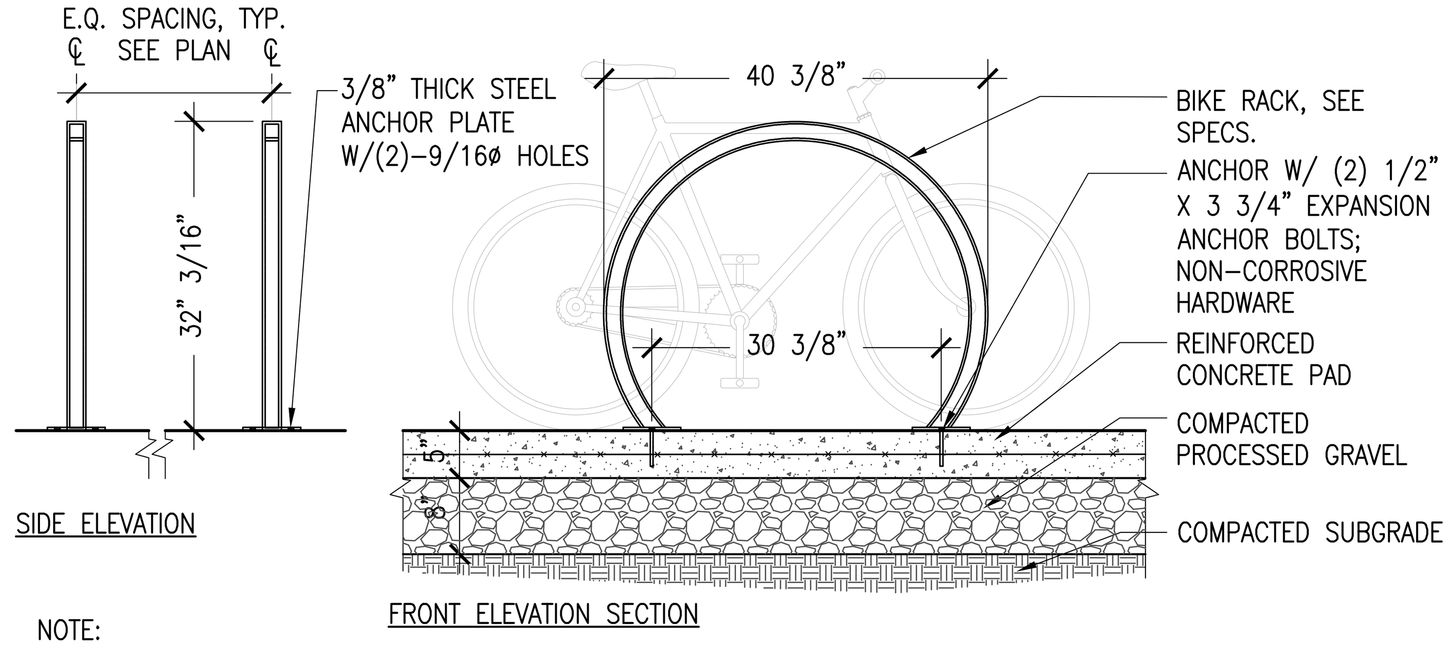
100% DESIGN DEVELOPMENT SET

Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB
Checked By: KZ
Date: NOVEMBER 13, 2020
Scale: AS SHOWN
Drawing Title:

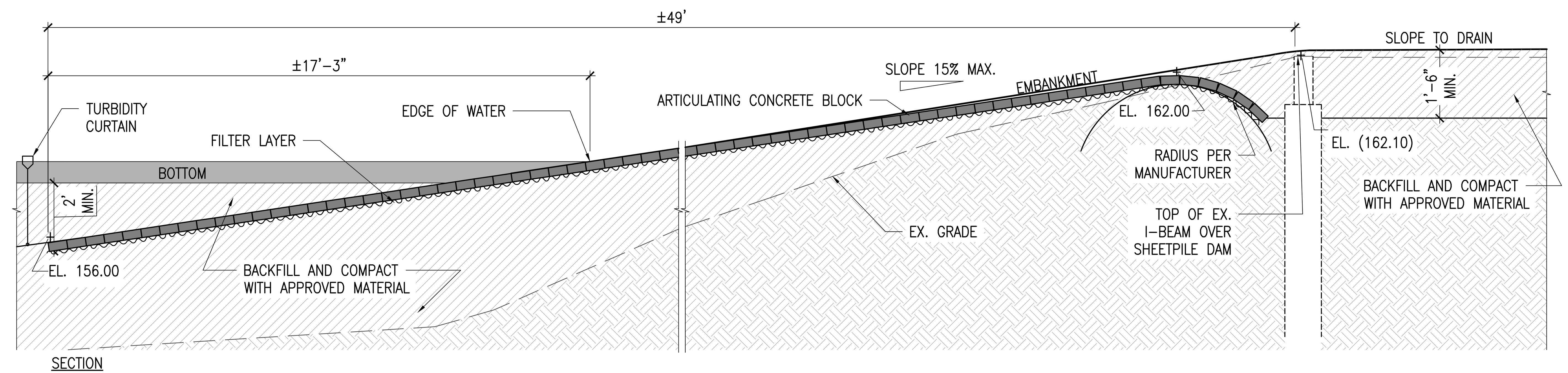
DETAILS

LD1.2

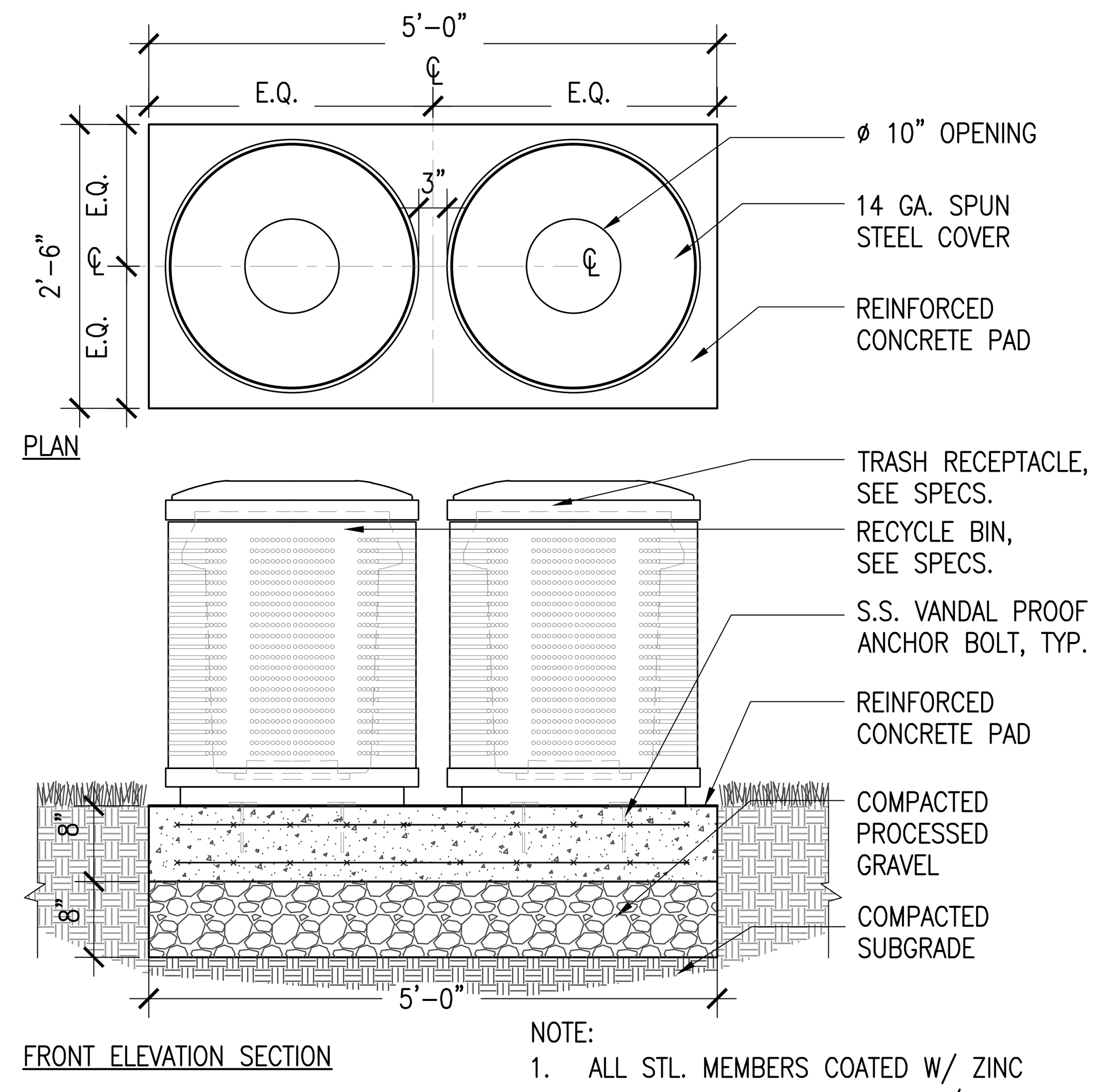


NOTE:
1. ALL STL. MEMBERS COATED W/ ZINC RICH EPOXY THEN FINISHED W/ POLYESTER POWDER COATING.
2. SEE SPECS. FOR COLOR INFO.

1 BIKE RACK
SCALE: 3/4" = 1'-0"

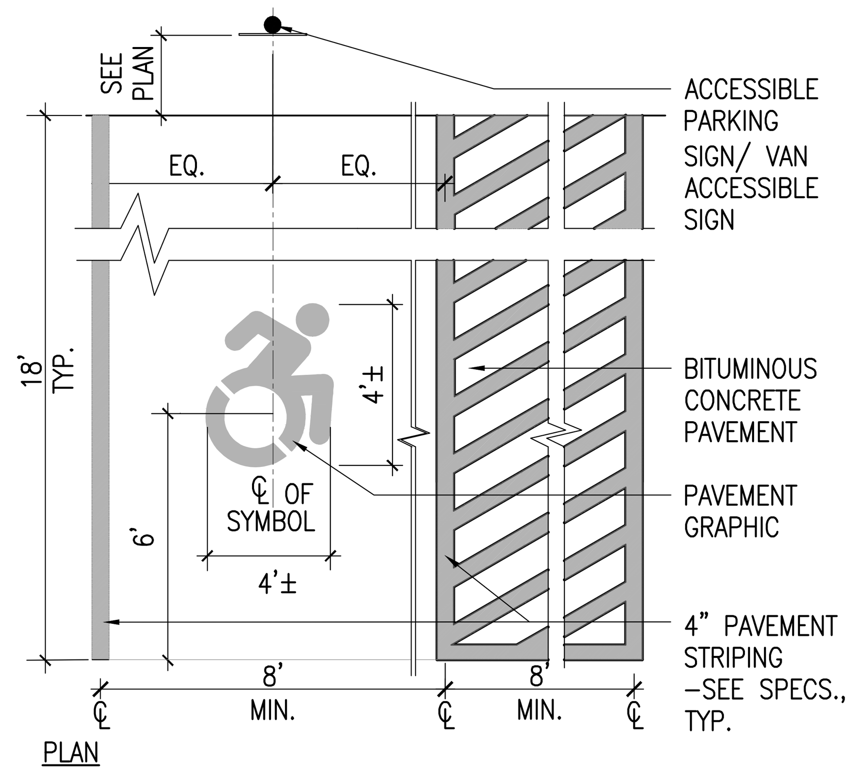


4 BOAT RAMP CONCRETE
SCALE: 3/8" = 1'-0"

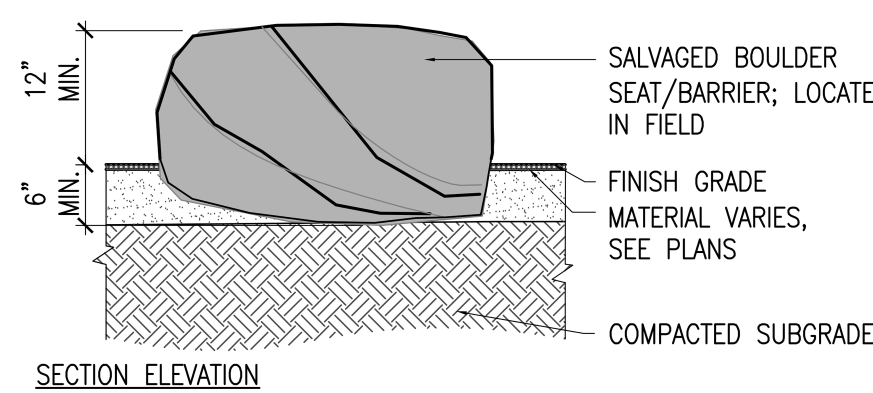


NOTE:
1. ALL STL. MEMBERS COATED W/ ZINC RICH EPOXY THEN FINISHED W/ POLYESTER POWDER COATING.
2. SEE SPECS. FOR COLOR INFO.

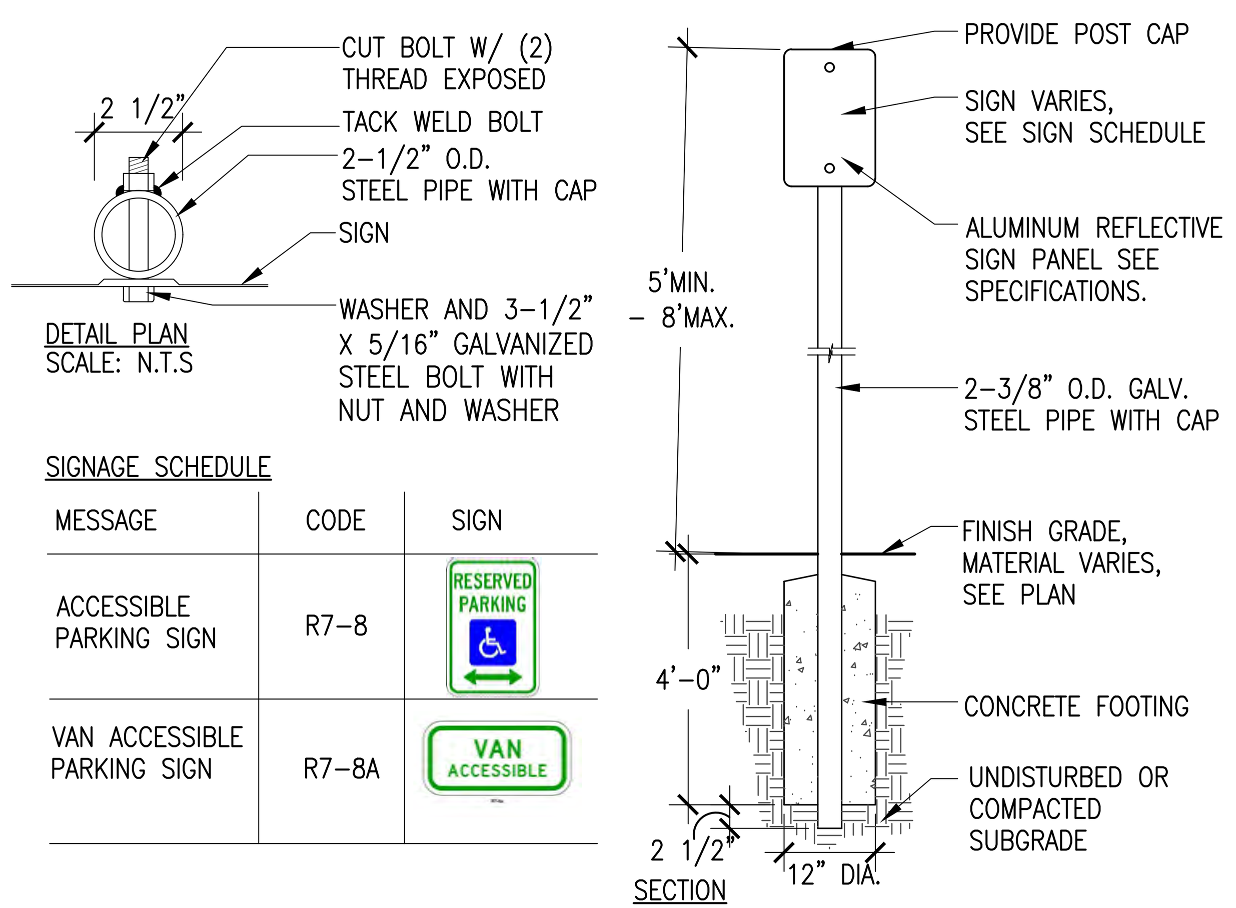
2 TRASH RECEPTACLE AND RECYCLING BIN
SCALE: 3/4" = 1'-0"



5 PAVEMENT MARKING - ACCESSIBILITY
SCALE: N.T.S.



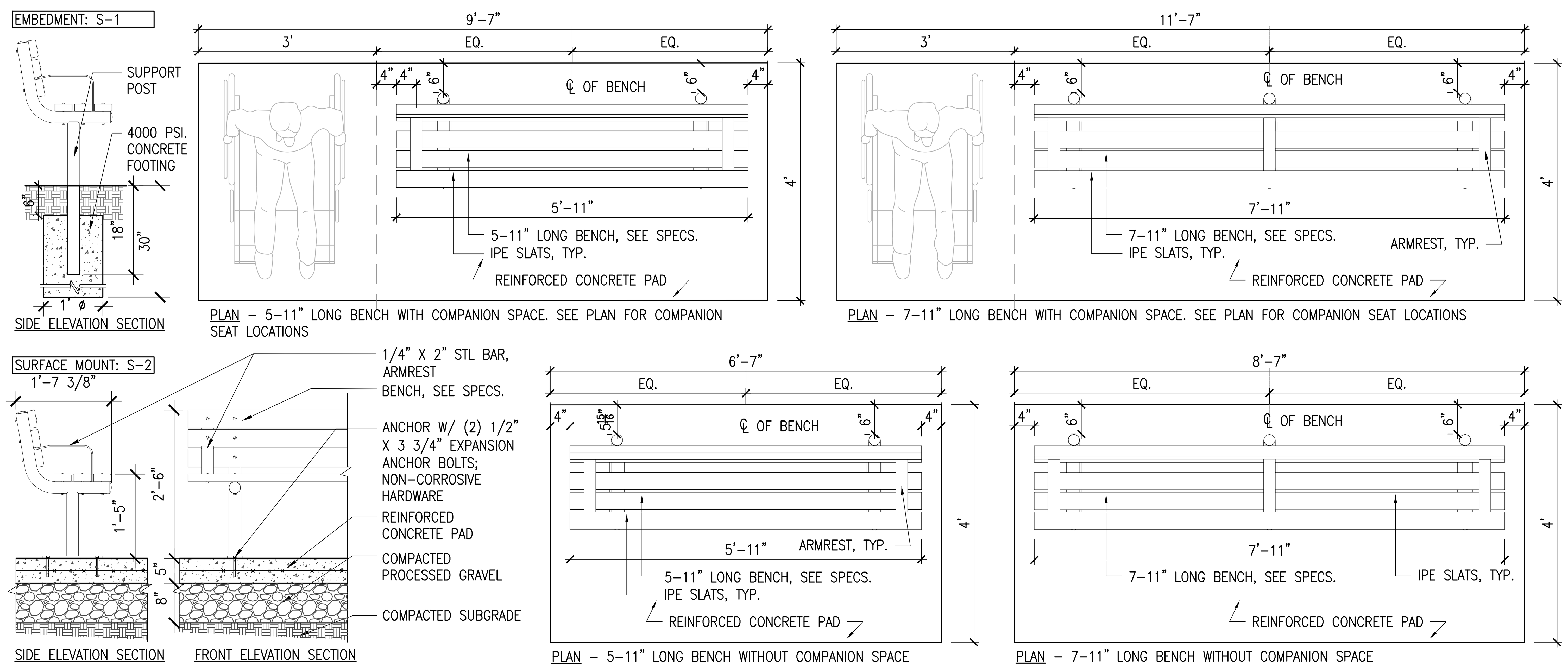
7 PLACED BOULDER
SCALE: 3/4" = 1'-0"



SIGNAGE SCHEDULE

MESSAGE	CODE	SIGN
ACCESSIBLE PARKING SIGN	R7-8	RESERVED PARKING
VAN ACCESSIBLE PARKING SIGN	R7-8A	VAN ACCESSIBLE

3 ACCESSIBLE PARKING SIGN
SCALE: 3/4" = 1'-0"



NOTE:
1. ALL STL. MEMBERS COATED W/ ZINC RICH EPOXY THEN FINISHED W/ POLYESTER POWDER COATING.
2. SEE SPECS. FOR COLOR INFO.
3. ALL BENCHES TO HAVE ARMRESTS.
4. ALL BENCHES TO HAVE IPE SLATS.
5. CONCRETE PAD SHALL HAVE 2% MAX SLOPE IN ALL DIRECTIONS.

6 BENCH
SCALE: 3/4" = 1'-0"

ARLINGTON RESERVOIR - PHASE 2
ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO.	REVISION	DATE

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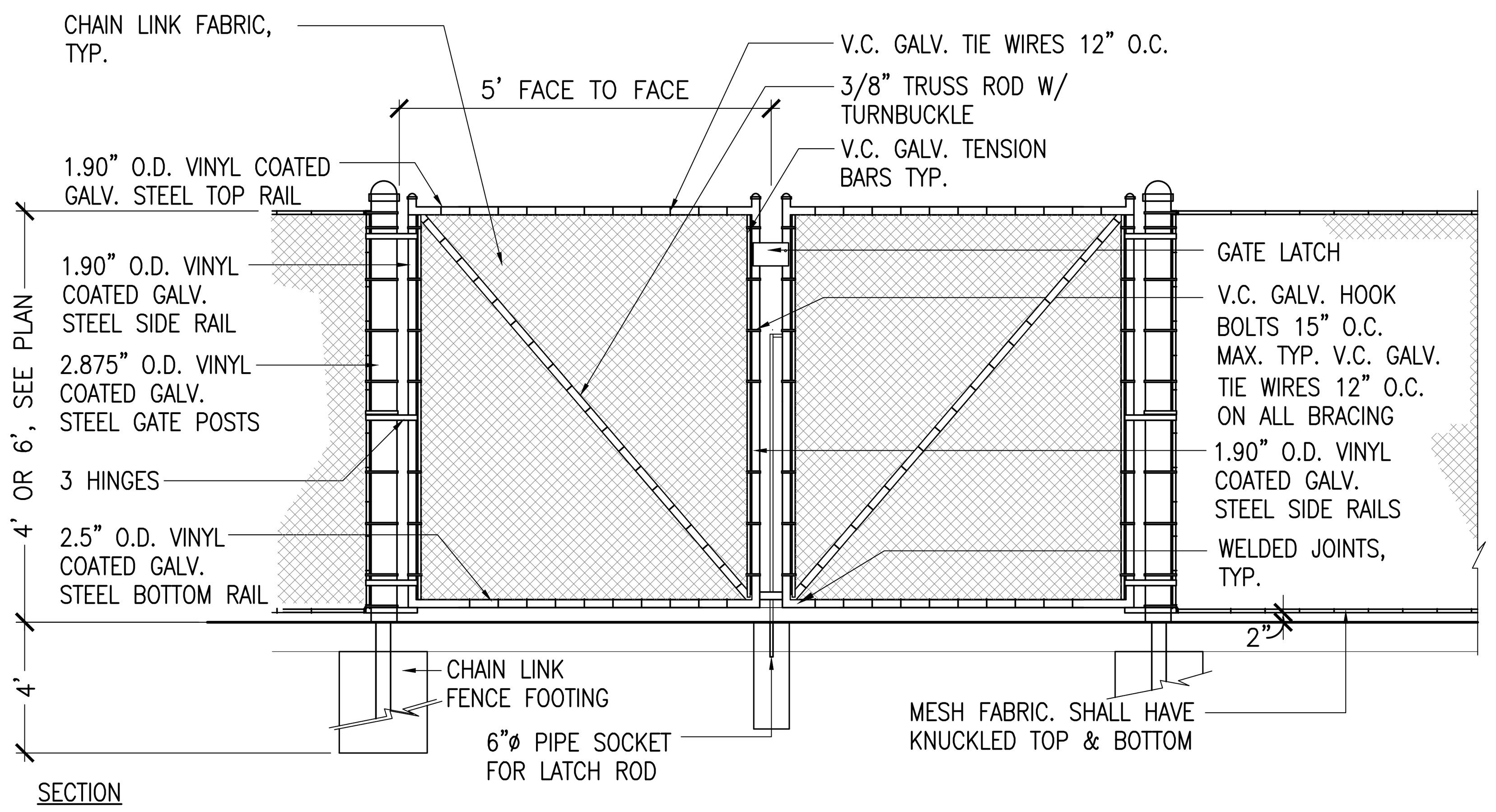
100% DESIGN DEVELOPMENT SET

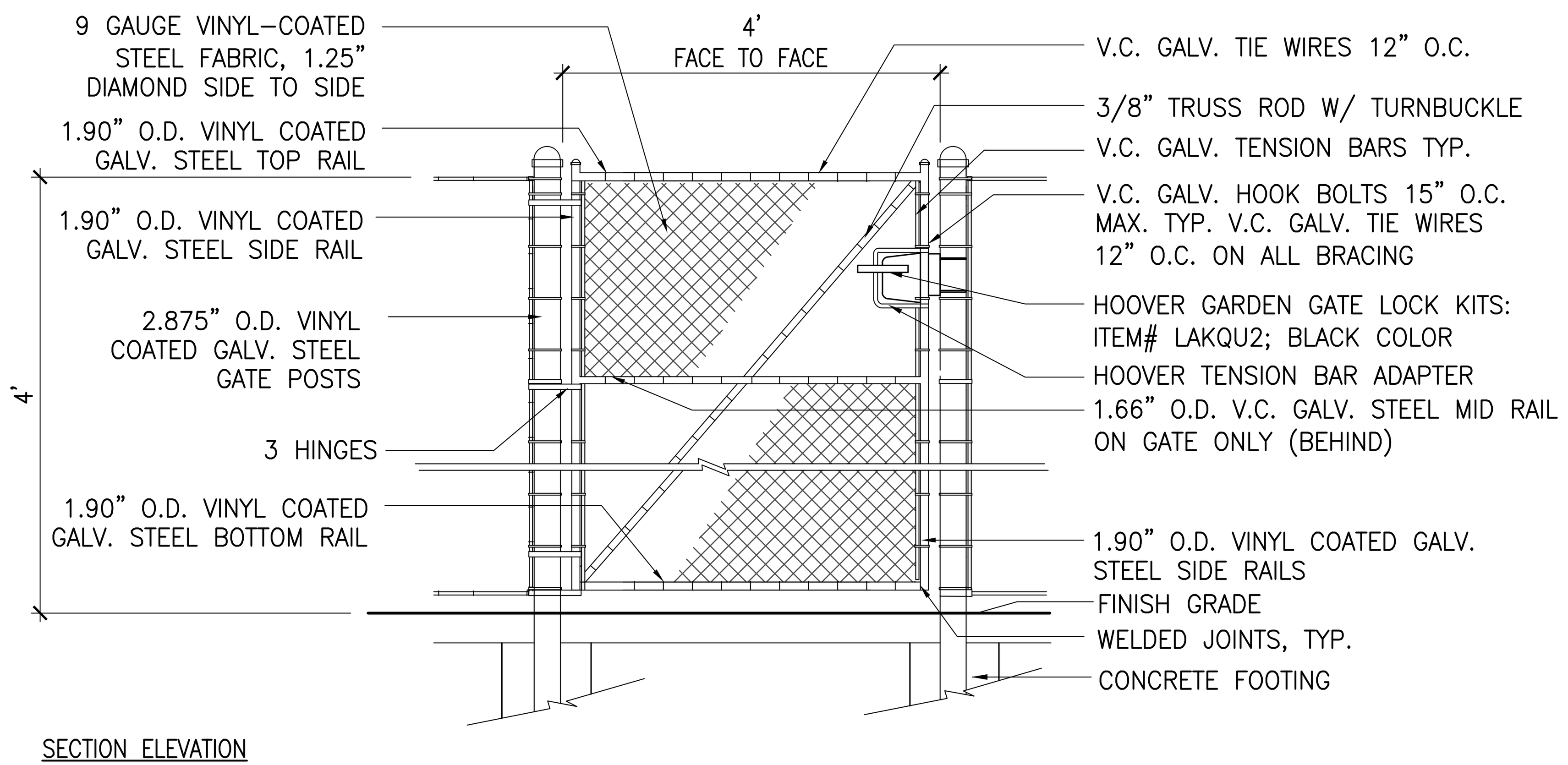
Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB
Checked By: KZ
Date: NOVEMBER 13, 2020
Scale: AS SHOWN
Drawing Title:
DETAILS

LD1.3



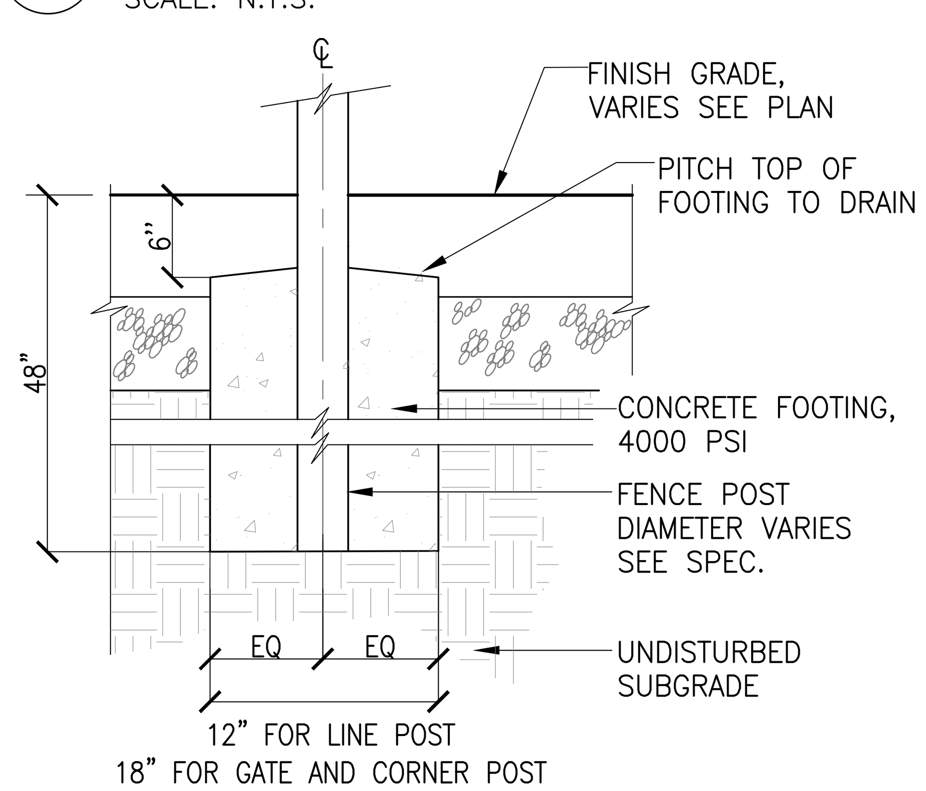
1 DOUBLE CHAIN LINK FENCE GATE

SCALE: N.T.S.



2 SINGLE CHAIN LINK GATE

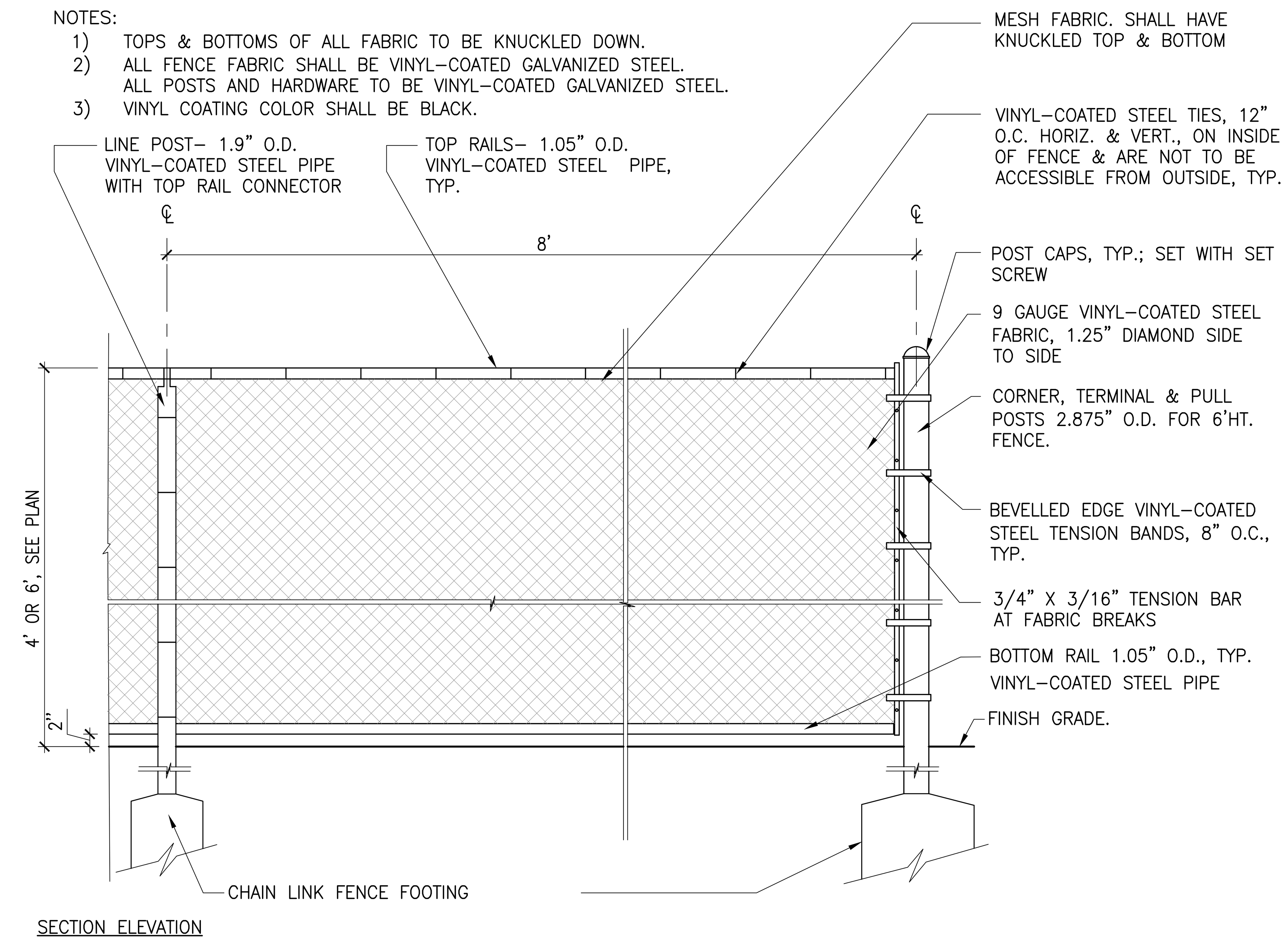
SCALE: N.T.S.



3 CHAIN LINK FENCE FOOTING

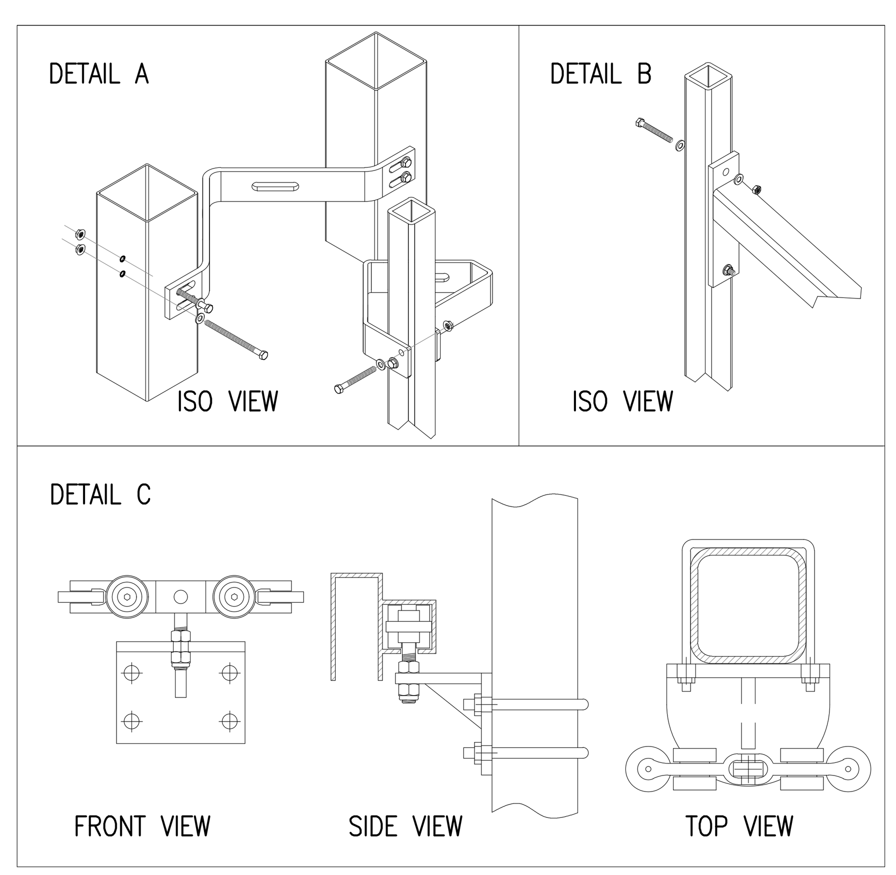
SCALE: 1" = 1'-0"

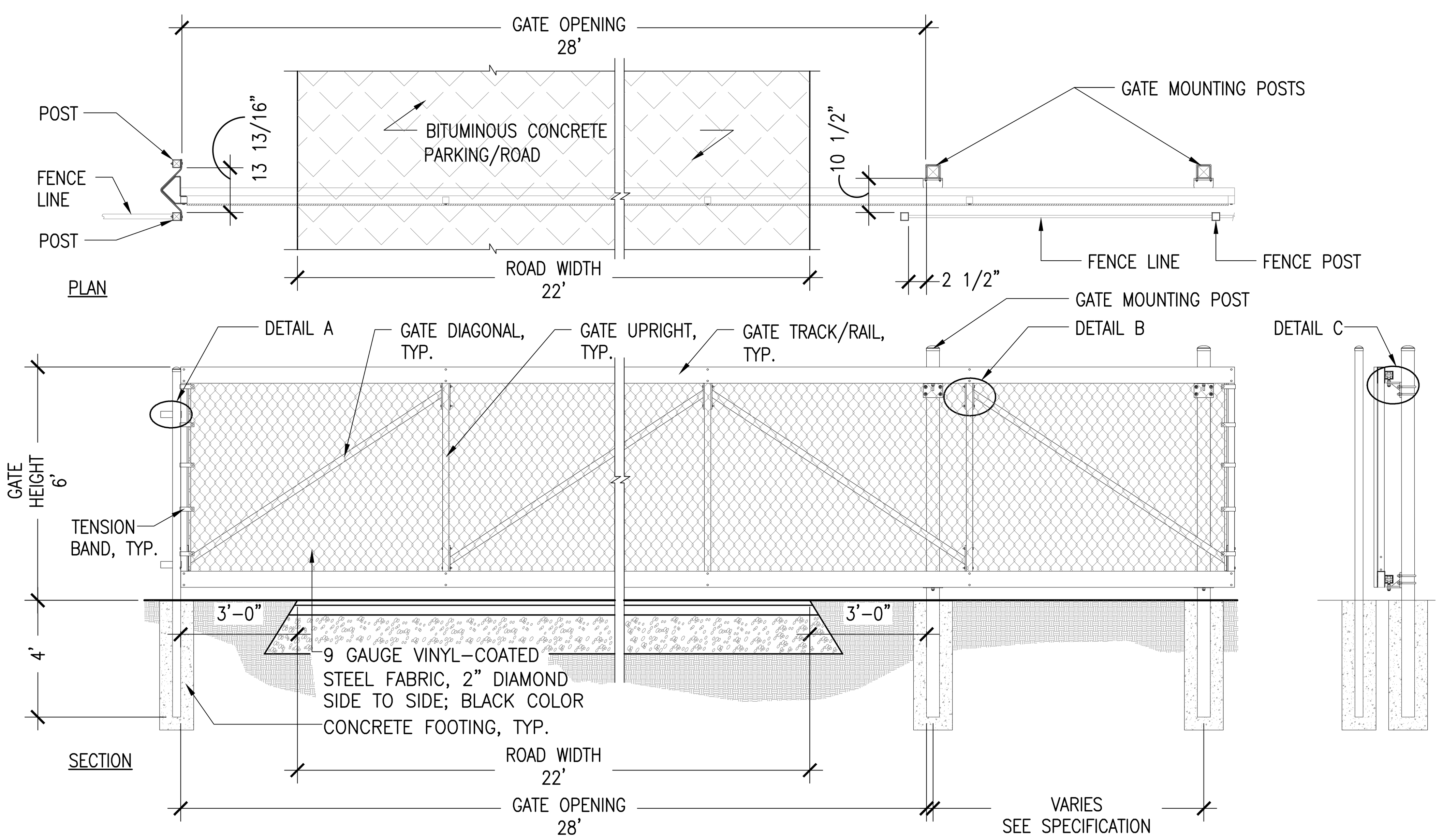
NOTES:
1) TOPS & BOTTOMS OF ALL FABRIC TO BE KNUCKLED DOWN.
2) ALL FENCE FABRIC SHALL BE VINYL-COATED GALVANIZED STEEL. ALL POSTS AND HARDWARE TO BE VINYL-COATED GALVANIZED STEEL.
3) VINYL COATING COLOR SHALL BE BLACK.



4 CHAIN LINK FENCE

SCALE: N.T.S.





NOTE:
1. VALUES SHOWN ARE NOMINAL AND NOT TO BE USED FOR INSTALLATION PURPOSES. SEE PRODUCT SPECIFICATION FOR INSTALLATION REQUIREMENTS.
2. ALL FENCE FABRIC SHALL BE BLACK VINYL-COATED GALVANIZED STEEL.
3. ALL POSTS AND HARDWARE TO BE BLACK VINYL-COATED GALVANIZED STEEL.

5 CHAIN LINK FENCE CANTILEVER GATE

SCALE: N.T.S.

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

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100% DESIGN DEVELOPMENT SET

Job Number:
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Drawn By: JL/MD/RB
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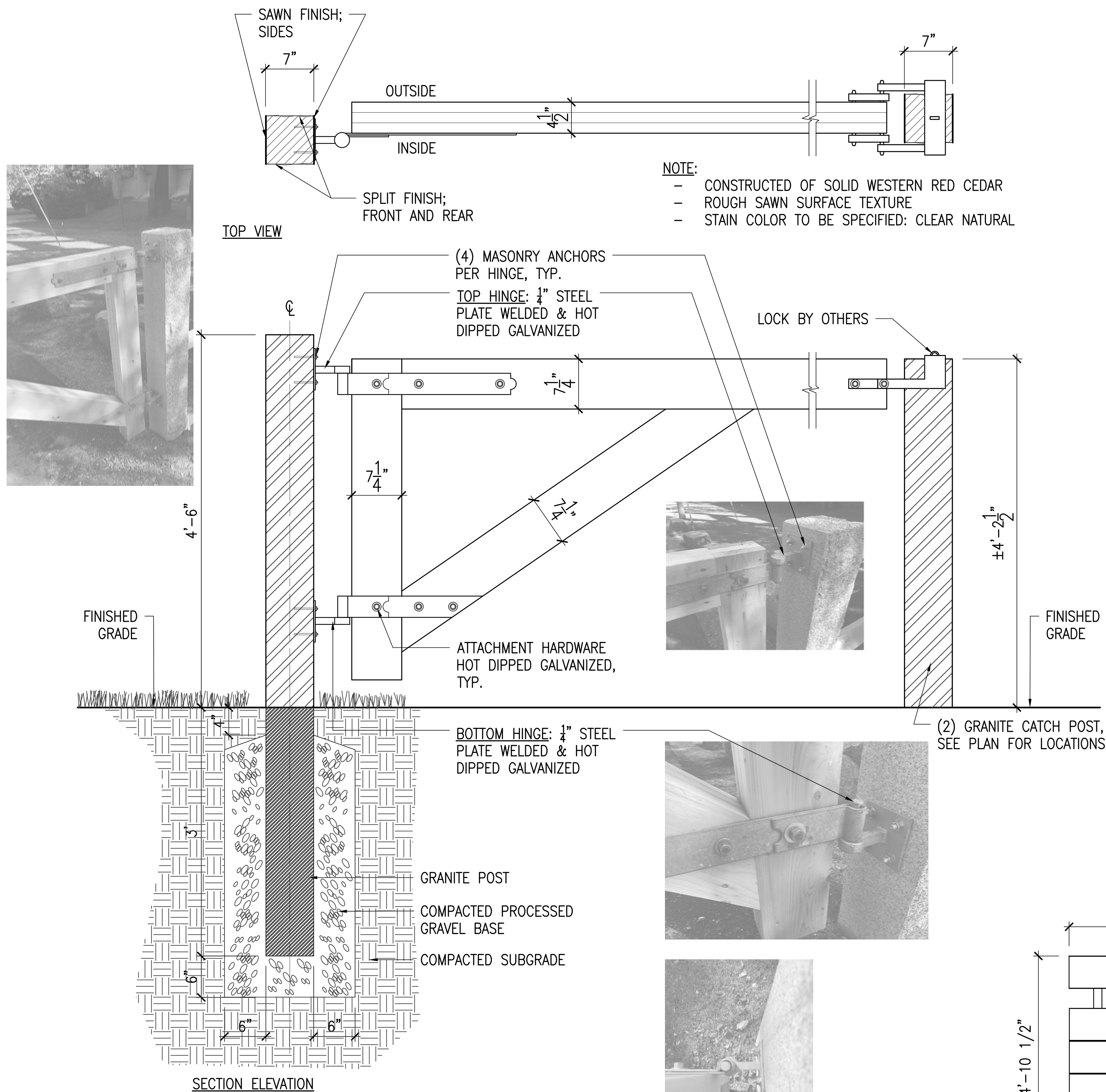
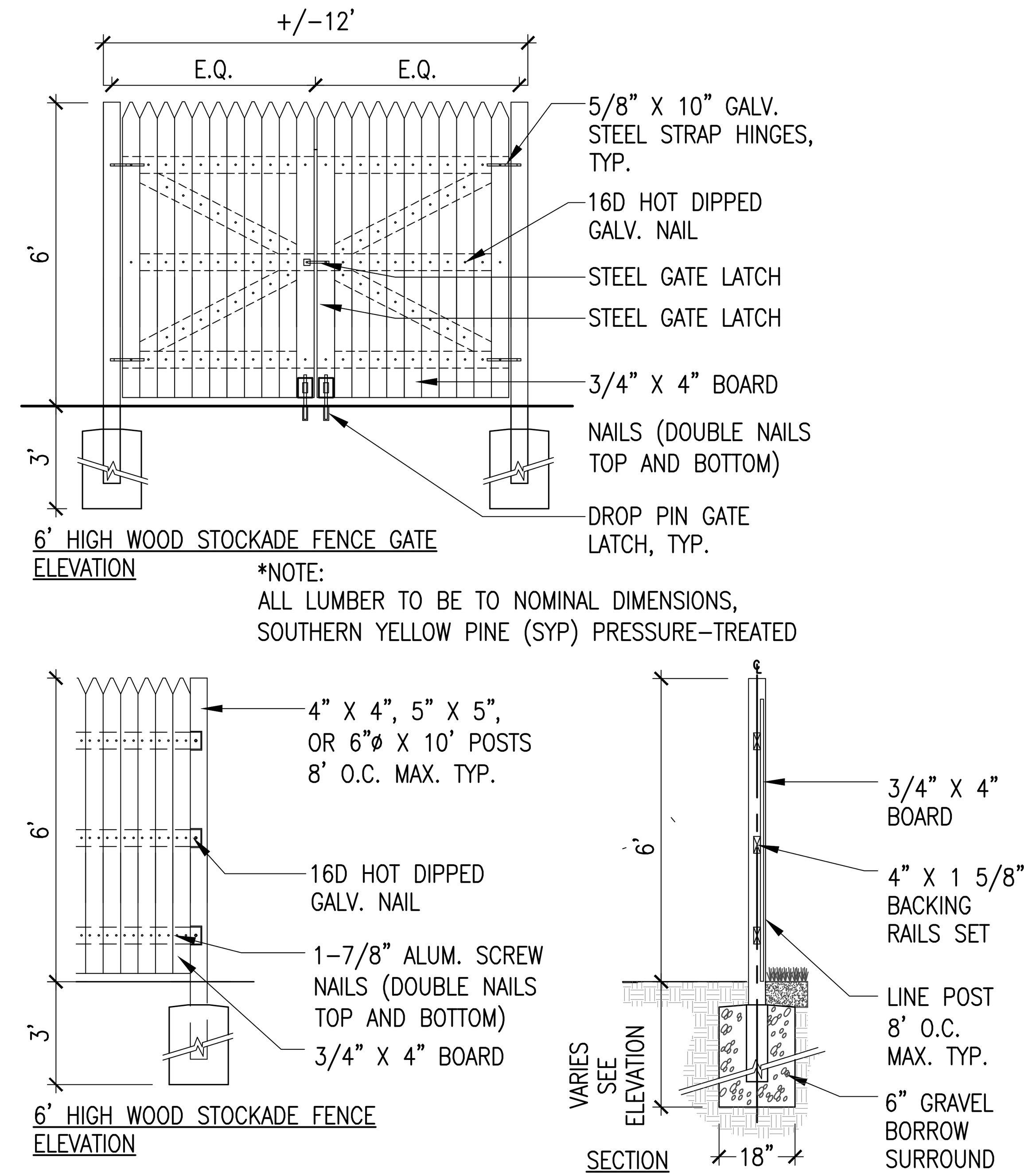
Scale: AS SHOWN
Drawing Title:

DETAILS

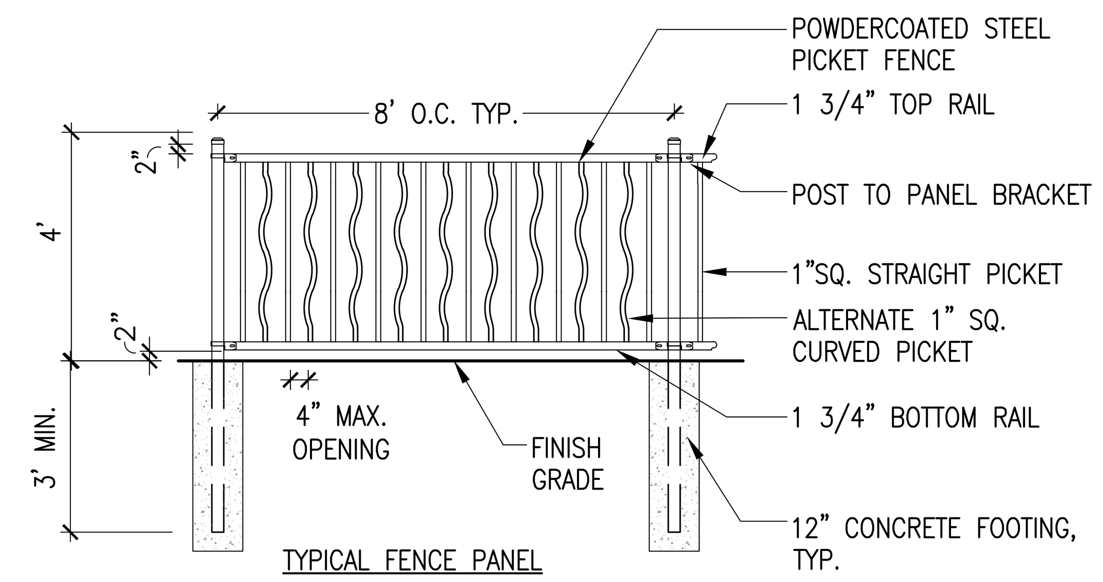
LD1.4



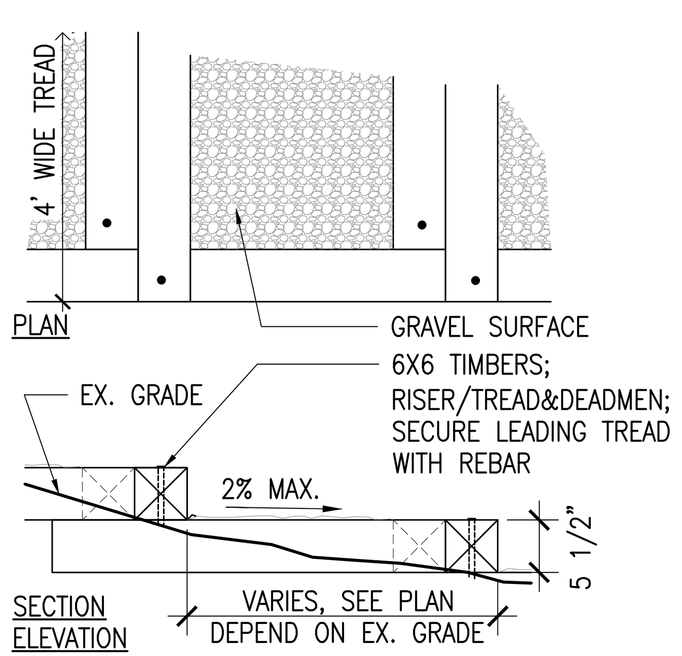
1 WOODEN GATE W/ GRANITE POST
SCALE: 1" = 1'-0"



3 UTILITY FENCE
SCALE: N.T.S.

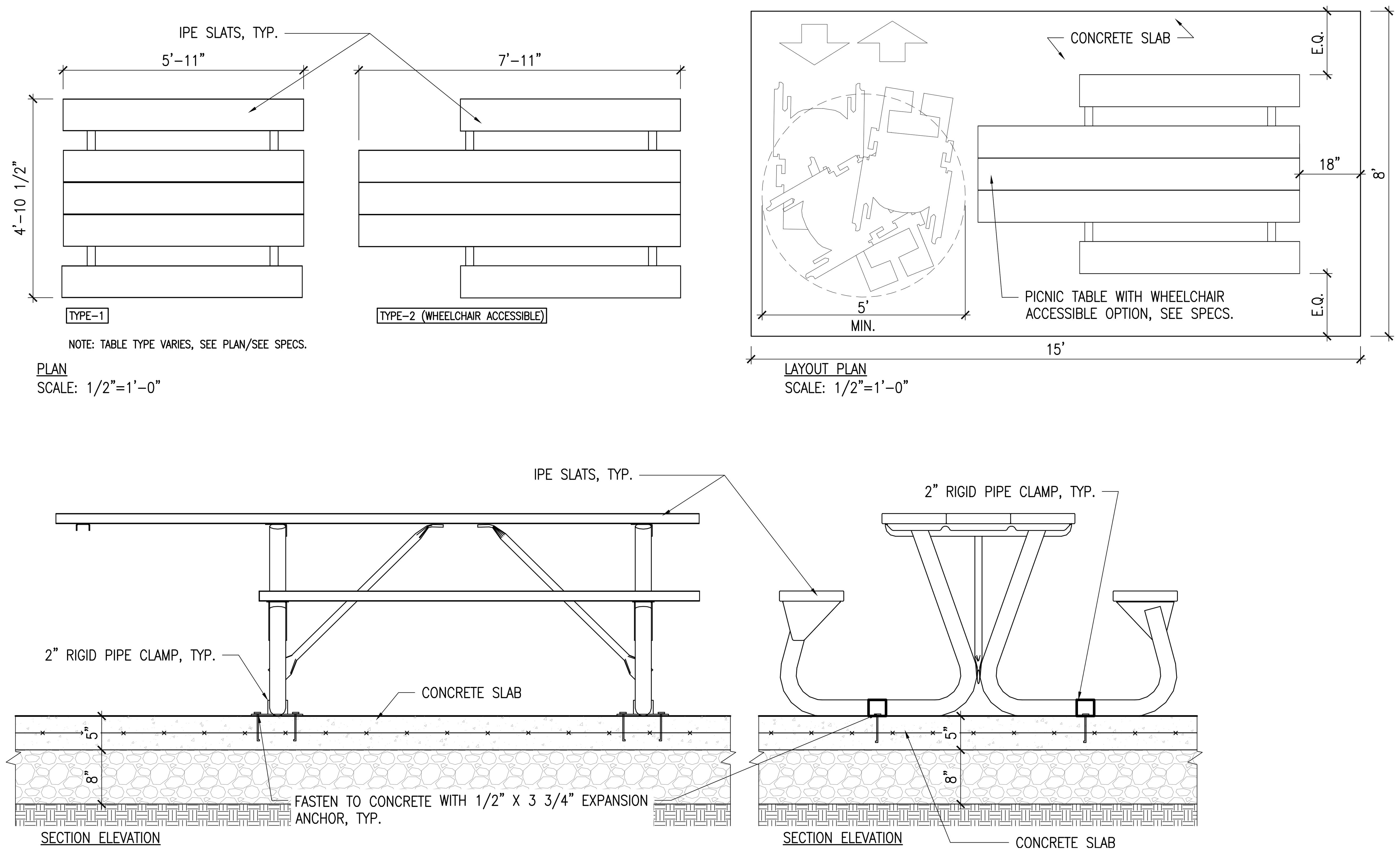


5 ORNAMENTAL FENCE- ADD ALT
SCALE: 3/8" = 1'-0"



NOTE:
1. LUMBER TO BE TREATED WITH LOW TOXICITY WOOD PRESERVATIVE
2. GRAVEL COLOR TO BE APPROVED BY LANDSCAPE ARCHITECT
3. TREAD LAYER TO BE FIRM AND STABLE CRUSHED STONE MIX
4. BASE LAYER TO BE FREE-DRAINING CRUSHED STONE
5. RISERS SHALL BE CONSISTENT THROUGHOUT STAIR RUN
6. ANCHORING TO SUBGRADE TO BE DESIGNED BY CONTRACTOR, AS NECESSARY

2 TIMBER CRIB STEP
SCALE: 3/4" = 1'-0"



4 PICNIC TABLE ON CONCRETE PAD
SCALE: 1" = 1'-0"

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

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100% DESIGN DEVELOPMENT SET

Job Number:
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Drawn By: JL/MD/RB | Checked By: KZ
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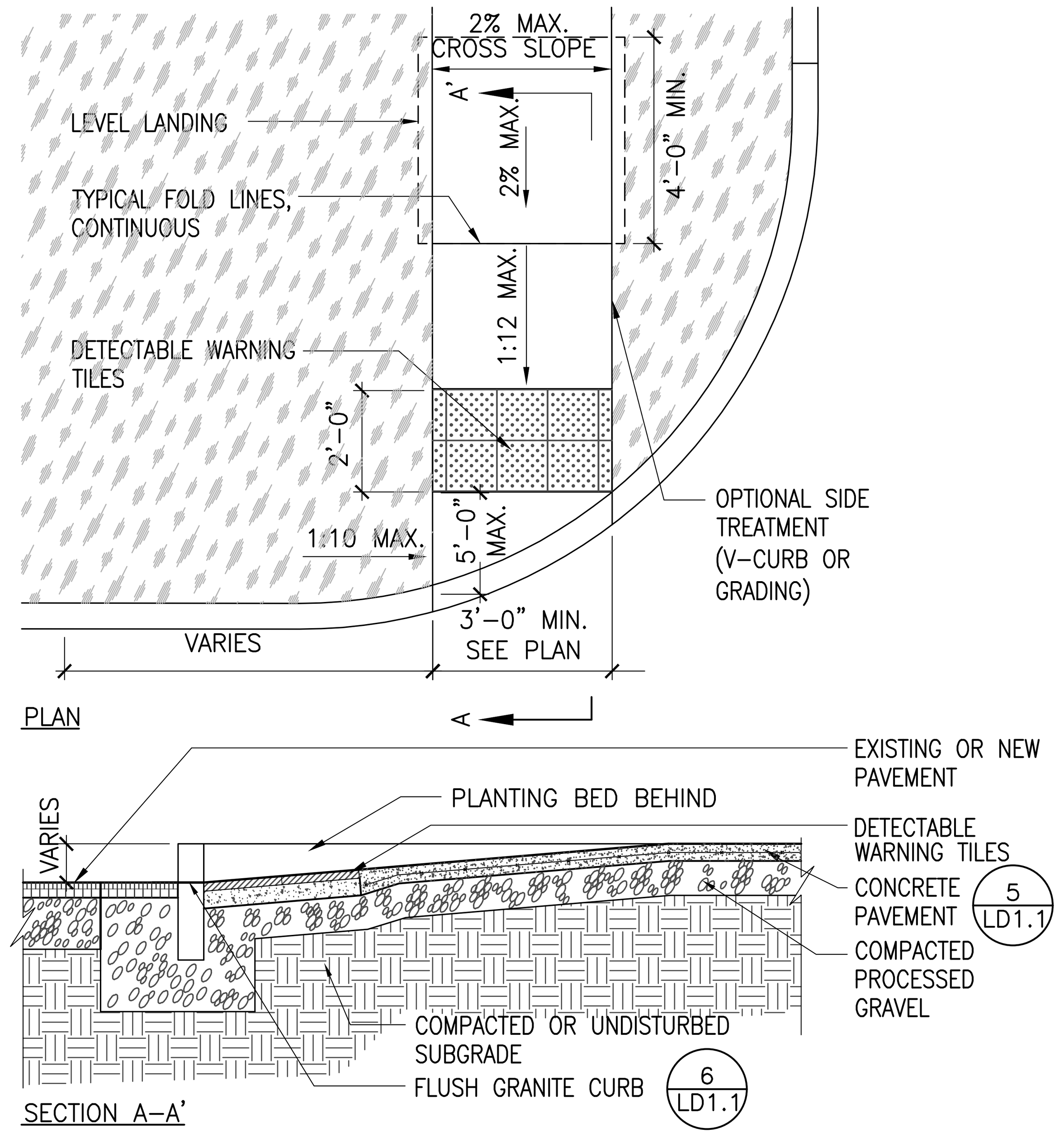
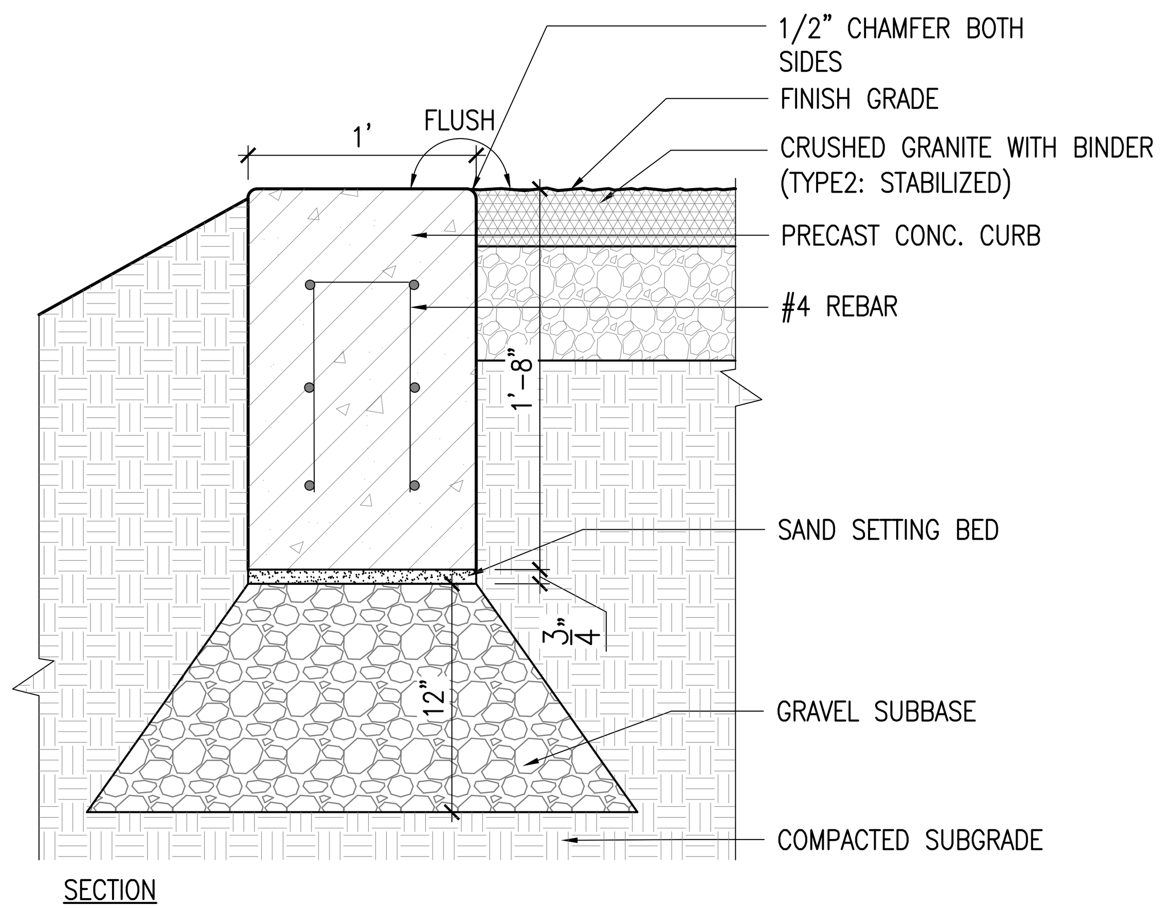
DETAILS

LD1.5



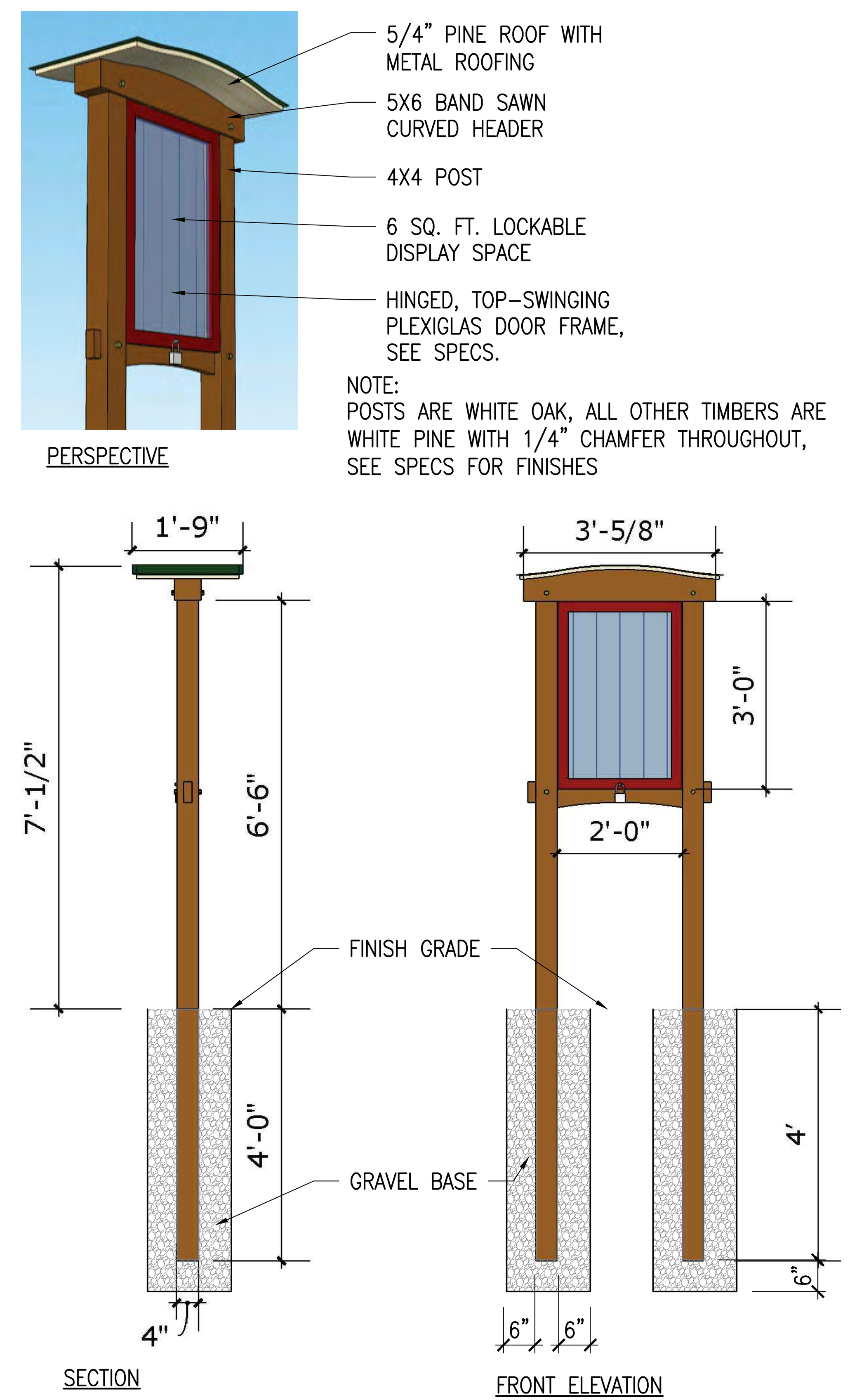
1 CURB RAMP

SCALE: 3/8" = 1'-0"



2 PRECAST CONCRETE CURB

SCALE: 1 1/2" = 1'-0"



3 TRAILHEAD KIOSK

SCALE: 1/2" = 1'-0"

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

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MASSACHUSETTS KYLE S. ZICK REGISTERED LANDSCAPE ARCHITECT

100% DESIGN DEVELOPMENT SET

Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB Checked By: KZ
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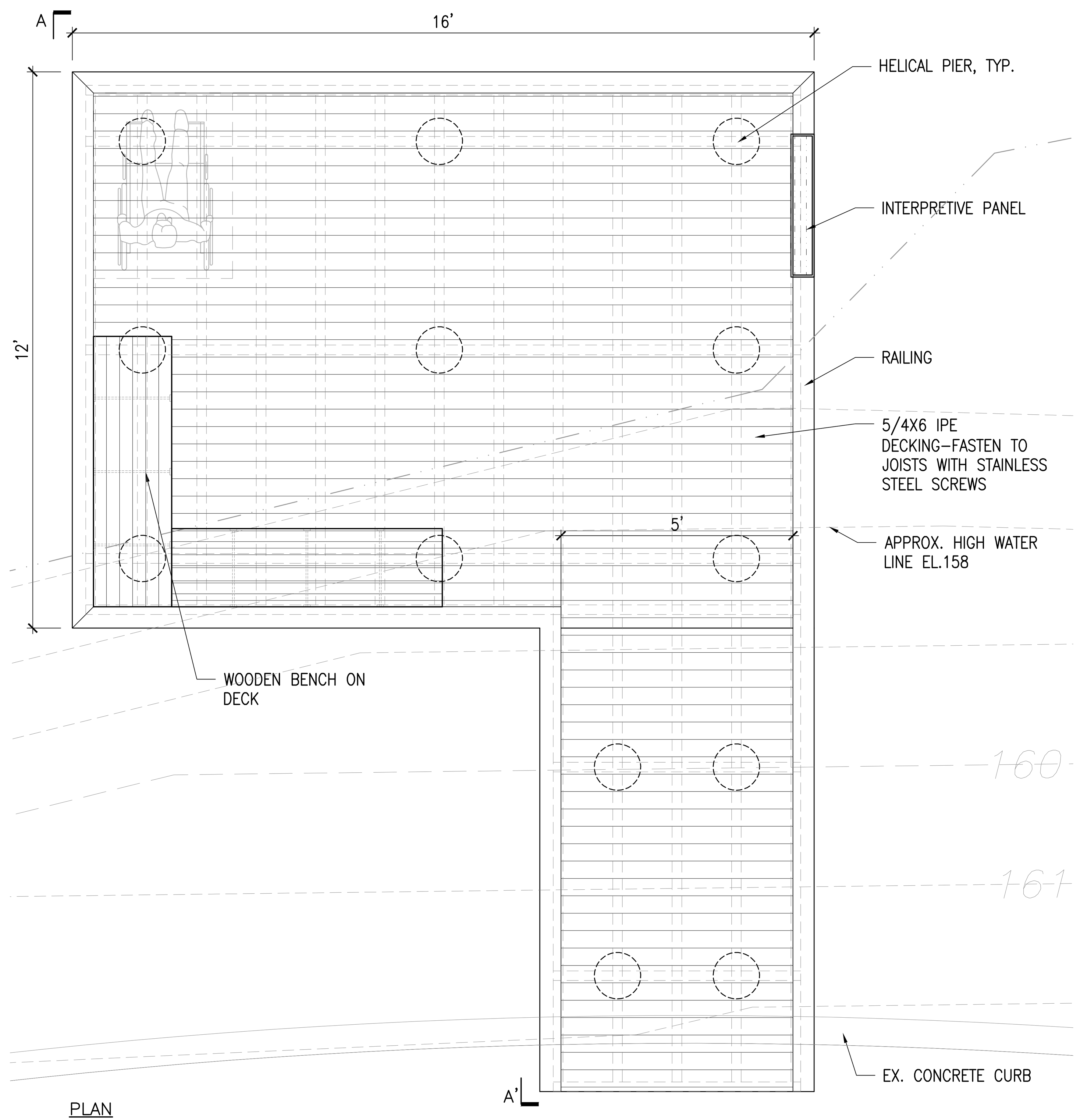
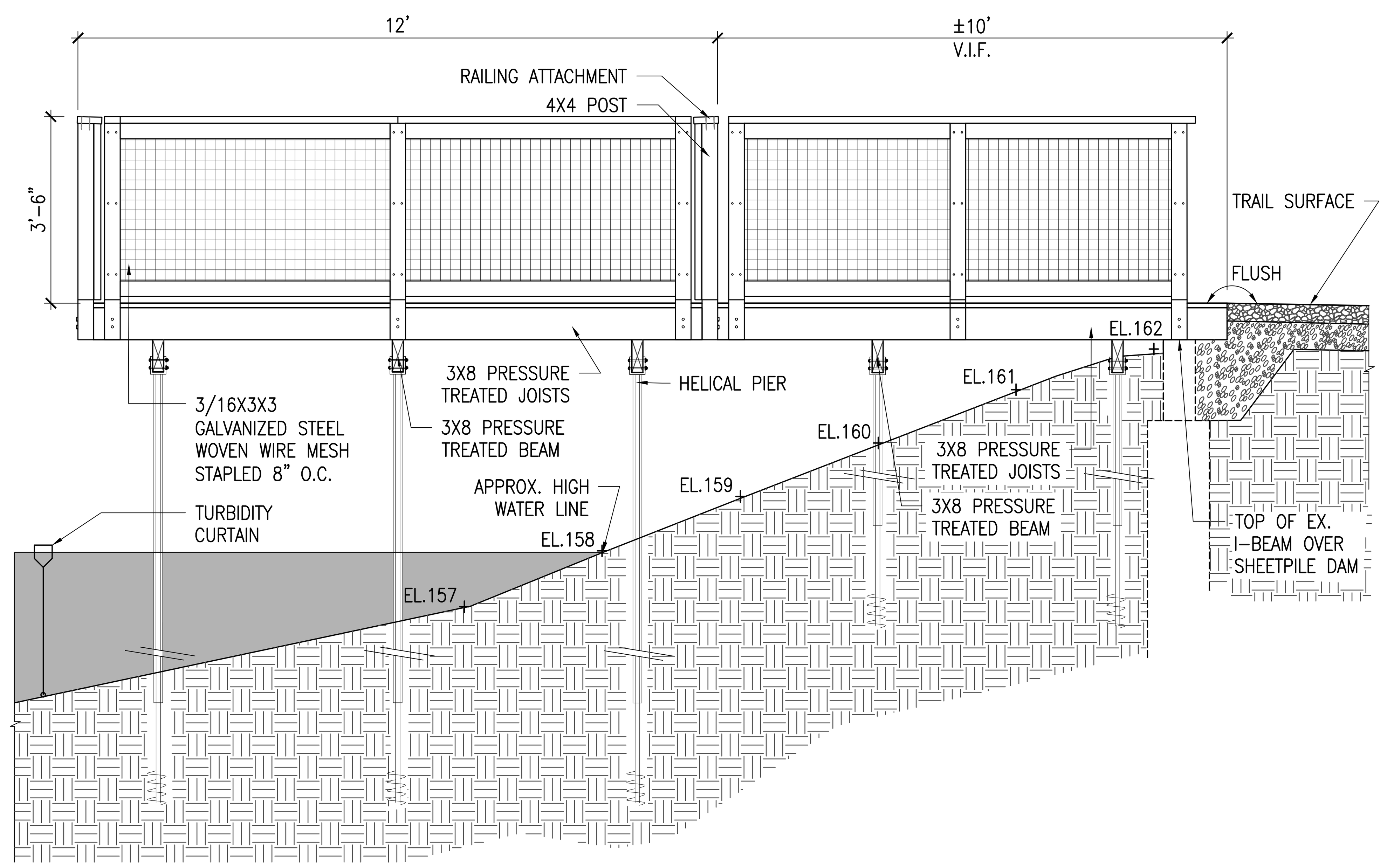
Drawing Title:

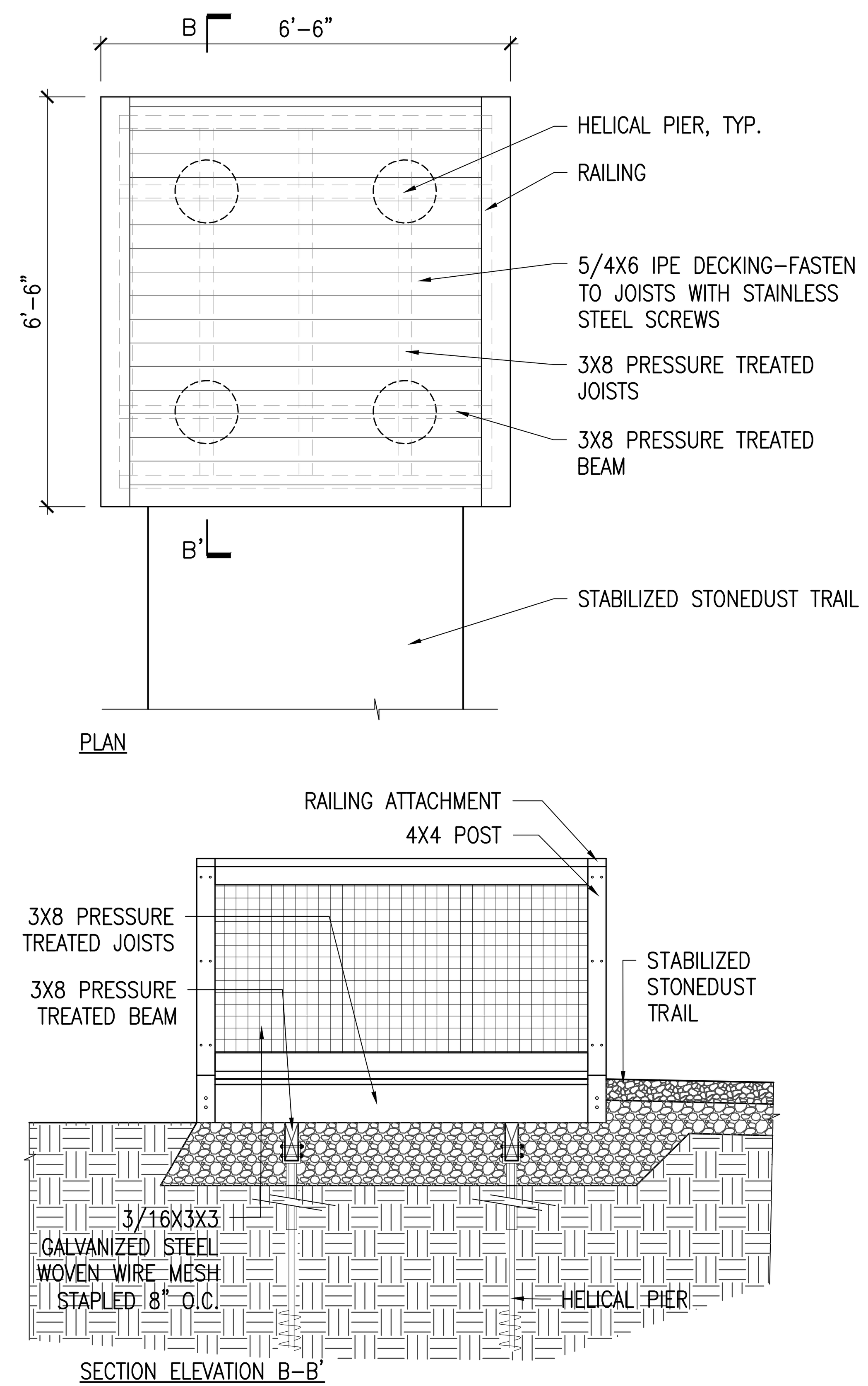
DETAILS

LD1.6

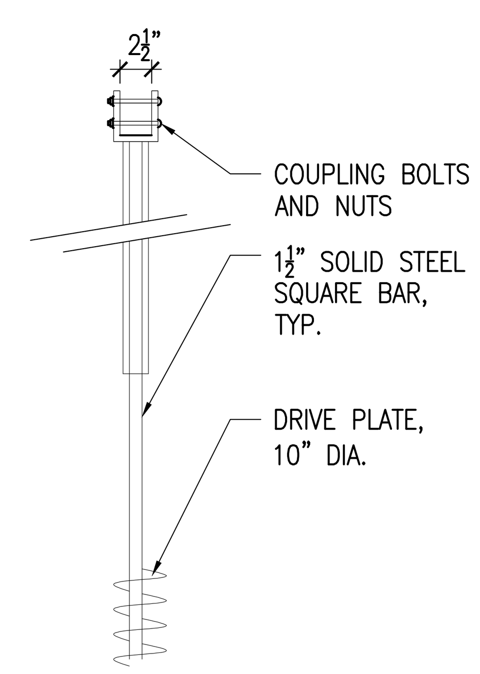




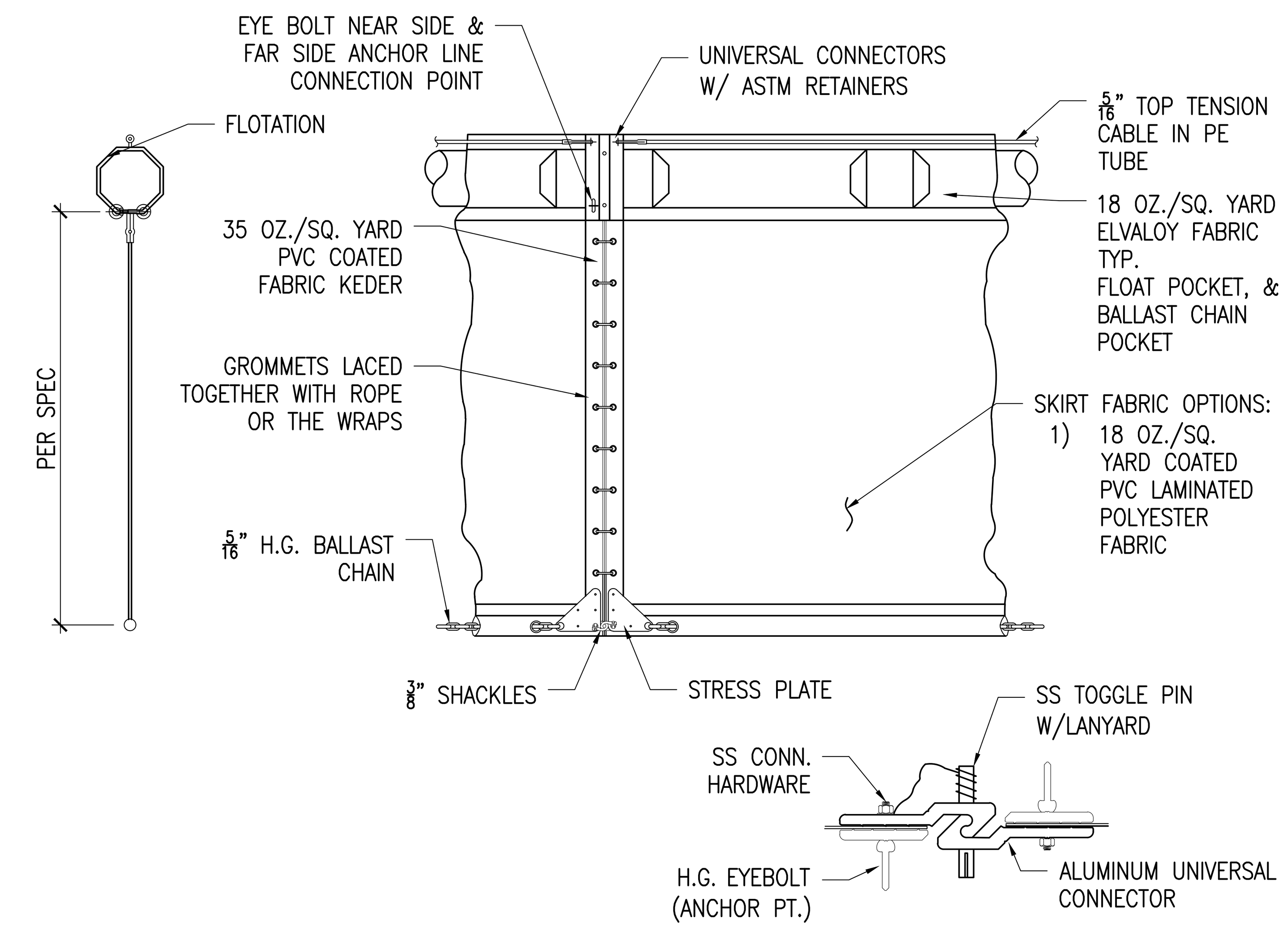
1 OVERLOOK TYPE-1
SCALE: 1/2" = 1'-0"



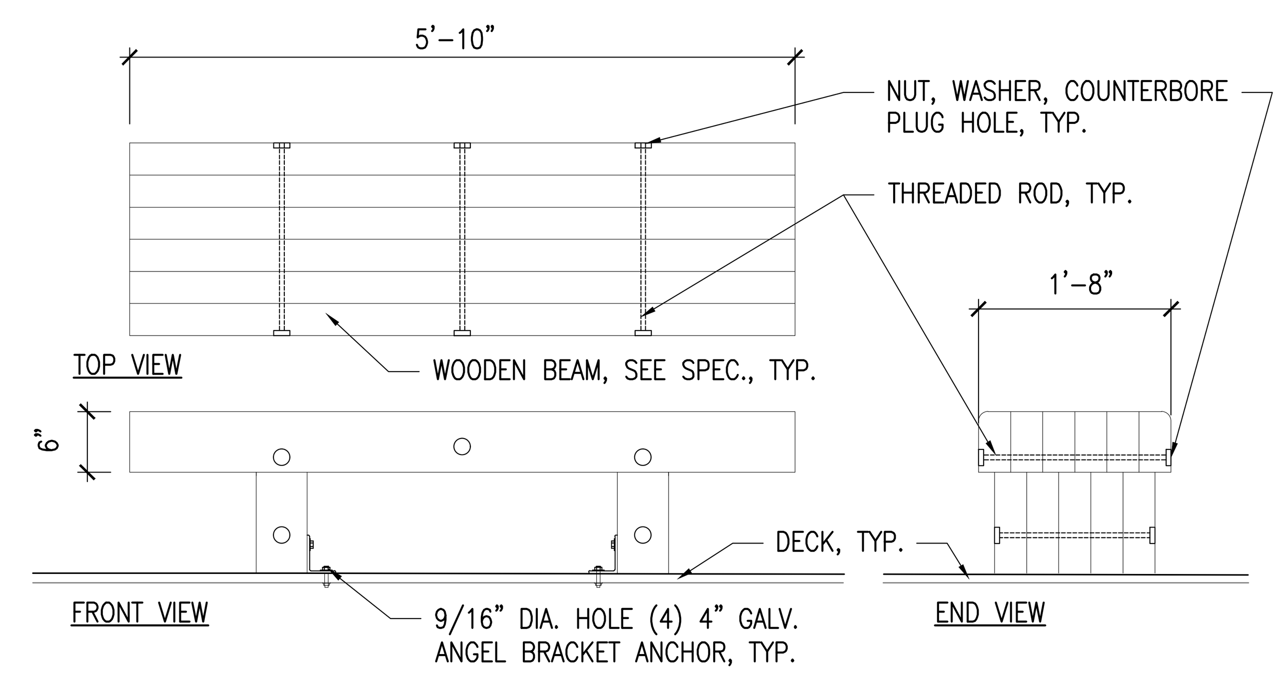
2 OVERLOOK TYPE-2
SCALE: 1/2" = 1'-0"



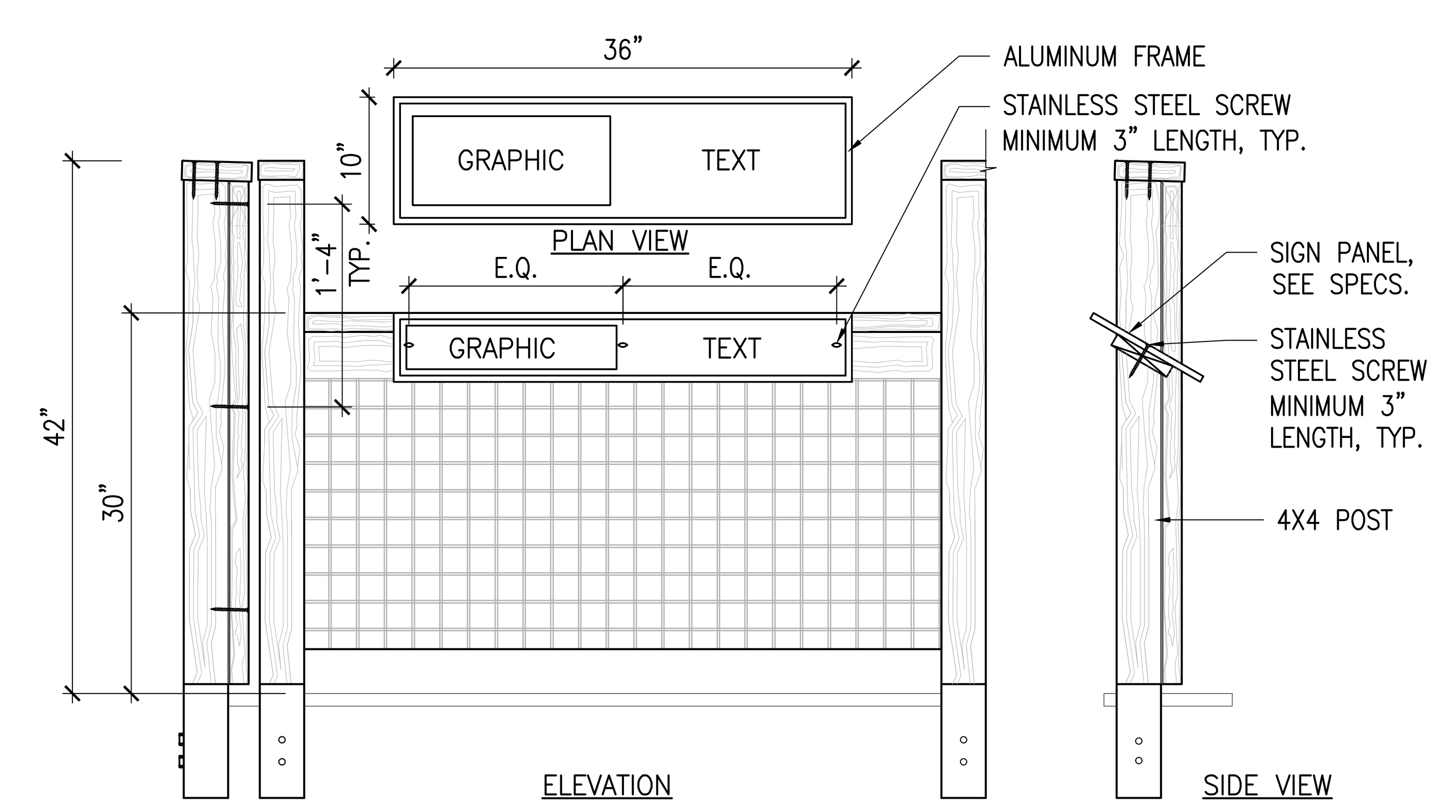
3 HELICAL PIER
SCALE: 1" = 1'-0"



4 TURBIDITY CURTAIN
SCALE: 1" = 1'-0"



5 WOODEN BENCH ON DECK
SCALE: 3/4" = 1'-0"



6 INTERPRETIVE PANEL
SCALE: 1" = 1'-0"

ARLINGTON RESERVOIR - PHASE 2

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COMMONWEALTH OF MASSACHUSETTS KYLE S. ZICK REGISTERED LANDSCAPE ARCHITECT

100% DESIGN DEVELOPMENT SET

Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB
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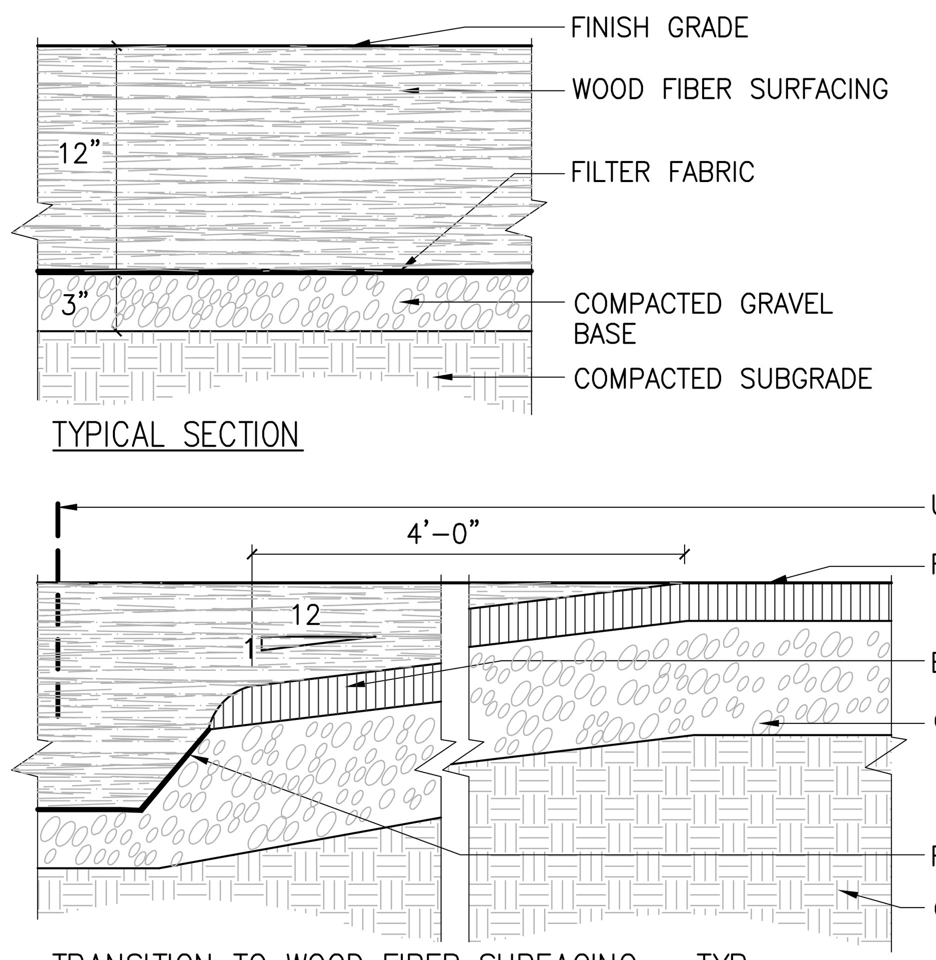
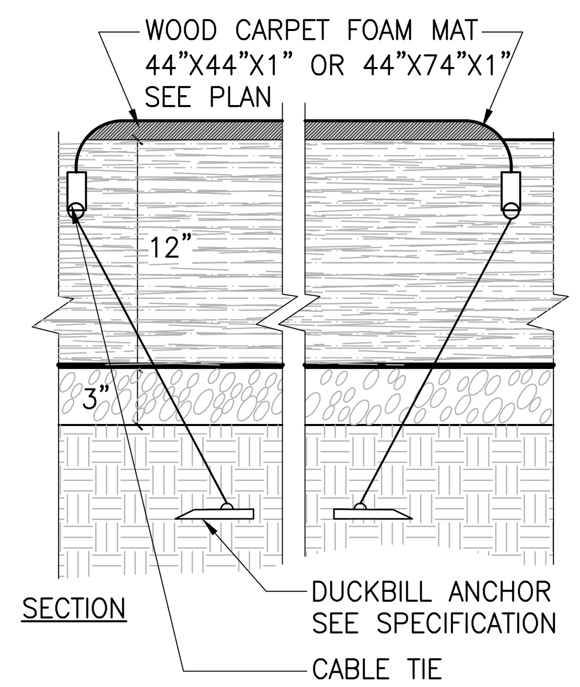
DETAILS

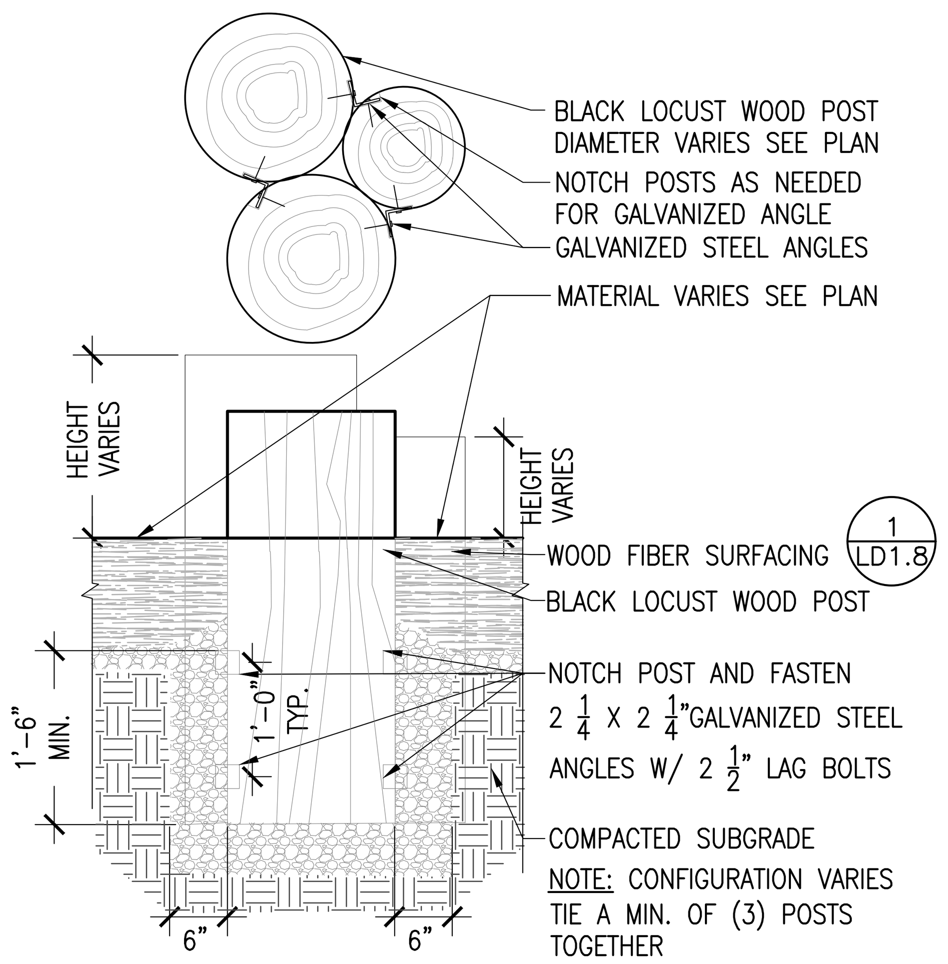
LD1.7



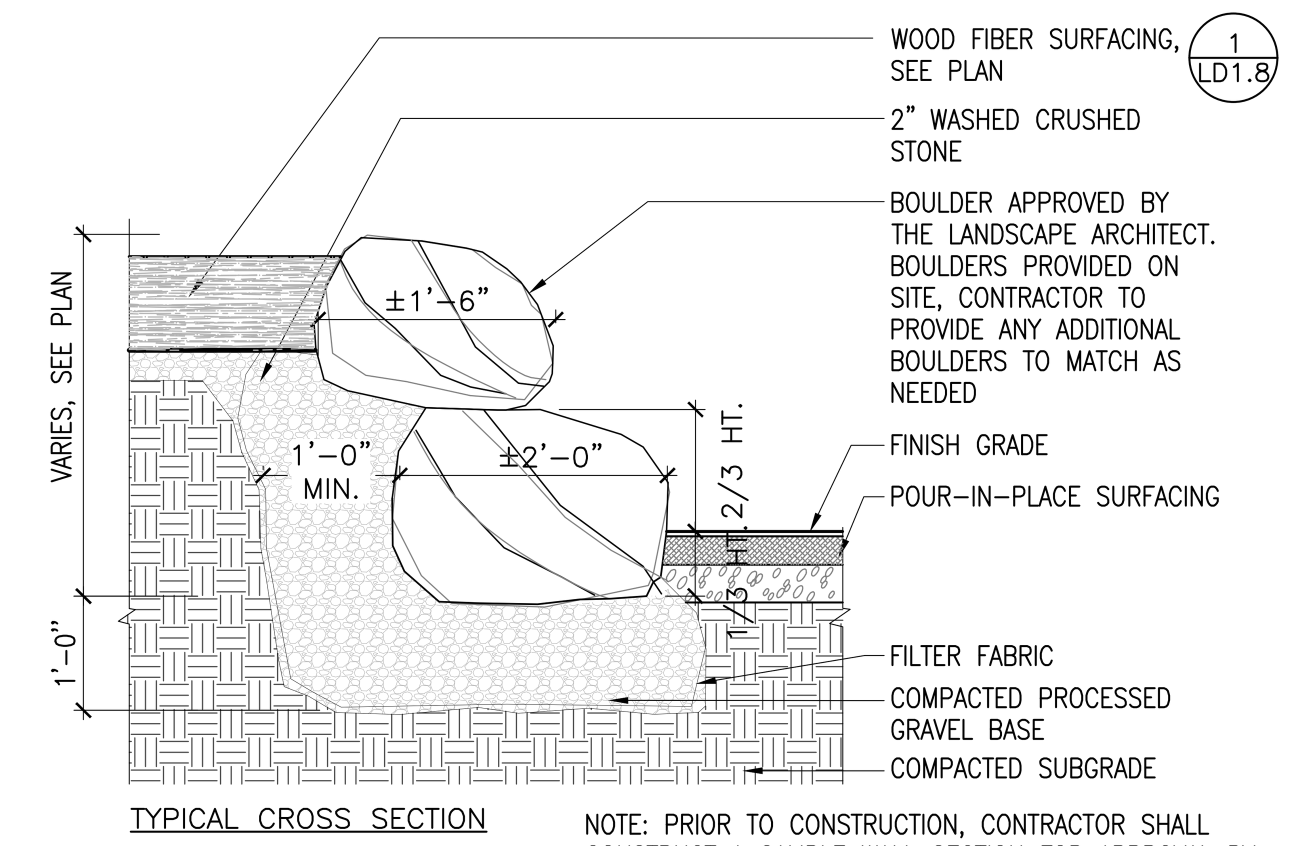
1 WOOD FIBER SURFACING
SCALE: 1 1/2" = 1'-0"



4 WOODCARPET FOAM MAT W/ ANCHOR KIT
SCALE: 1 1/2" = 1'-0"

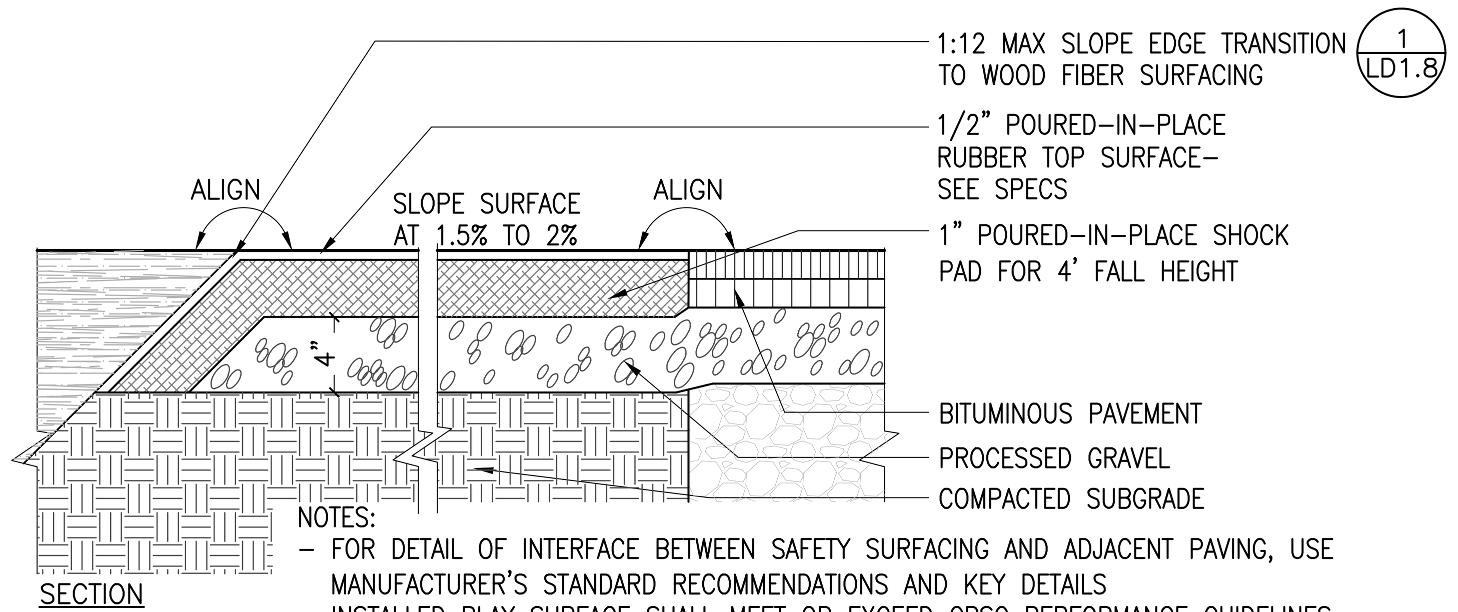


6 ROBINIA POST
SCALE: 3/4" = 1'-0"



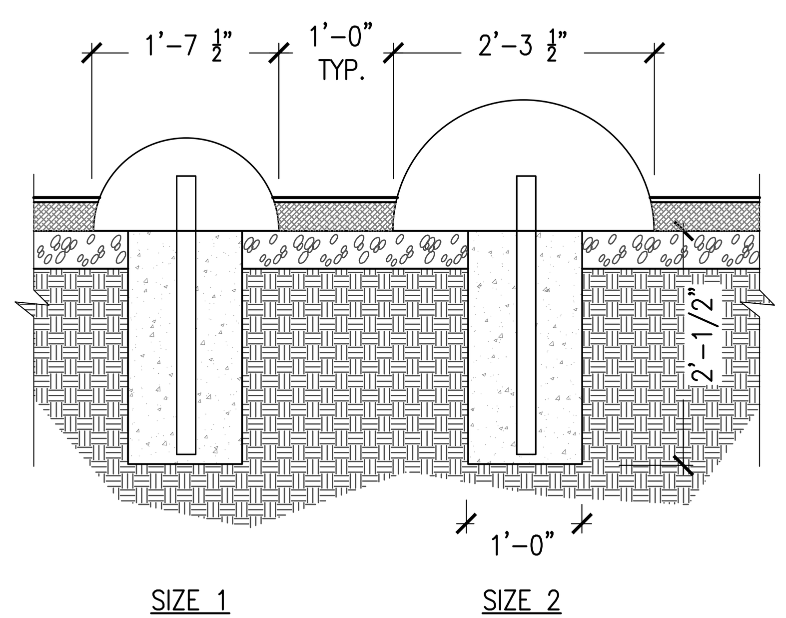
NOTE: PRIOR TO CONSTRUCTION, CONTRACTOR SHALL CONSTRUCT A SAMPLE WALL SECTION FOR APPROVAL BY THE LANDSCAPE ARCHITECT DEMONSTRATING CONSTRUCTION TECHNIQUE AND TYPE OF BOULDER USED.

8 BOULDER RETAINING WALL
SCALE: 3/4" = 1'-0"

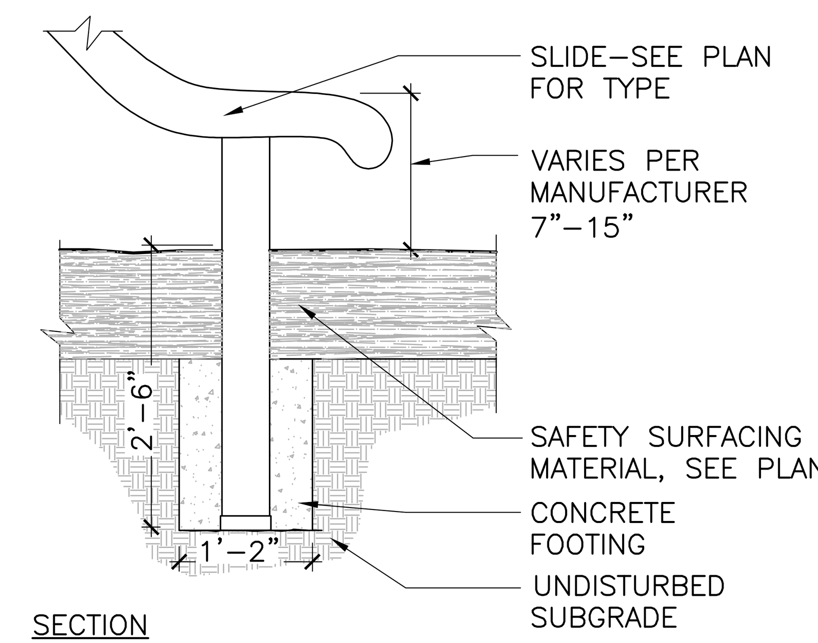


NOTES:
- FOR DETAIL OF INTERFACE BETWEEN SAFETY SURFACING AND ADJACENT PAVING, USE MANUFACTURER'S STANDARD RECOMMENDATIONS AND KEY DETAILS
- INSTALLED PLAY SURFACE SHALL MEET OR EXCEED CPSC PERFORMANCE GUIDELINES WITH RESPECT TO CRITICAL HEIGHTS OF THE IN-PLACE PLAY EQUIPMENT.
- THE THICKNESS SHOWN IN THE CONSTRUCTION DOCUMENTS IF THE MINIMUM REQUIRED.

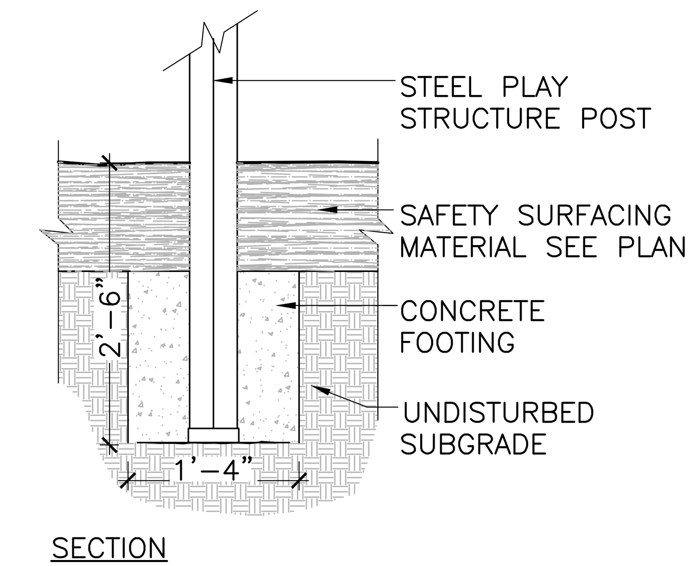
2 POUR-IN-PLACE SURFACING
SCALE: 1 1/2" = 1'-0"



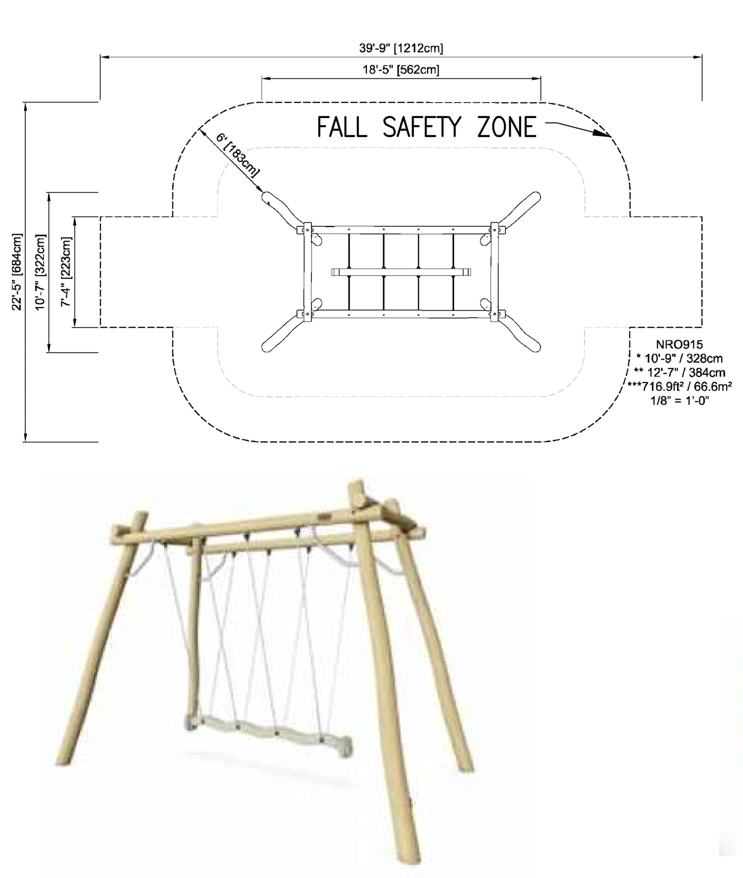
5 RUBBER HALF SPHERES
SCALE: 3/4" = 1'-0"



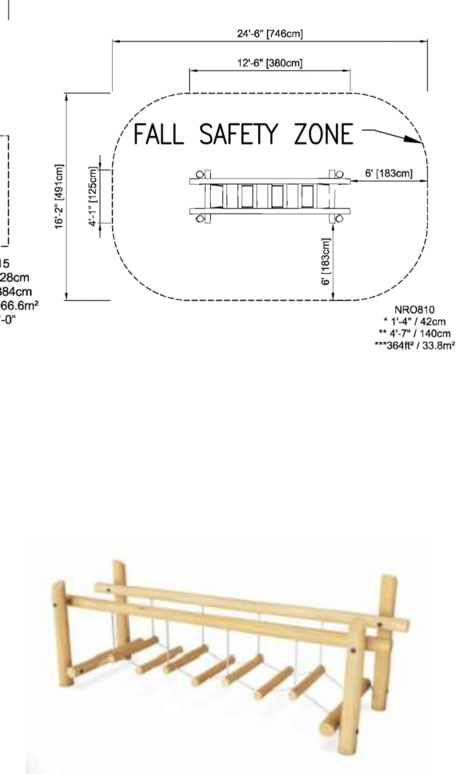
7 SLIDE BOTTOM FOOTING
SCALE: 3/4" = 1'-0"



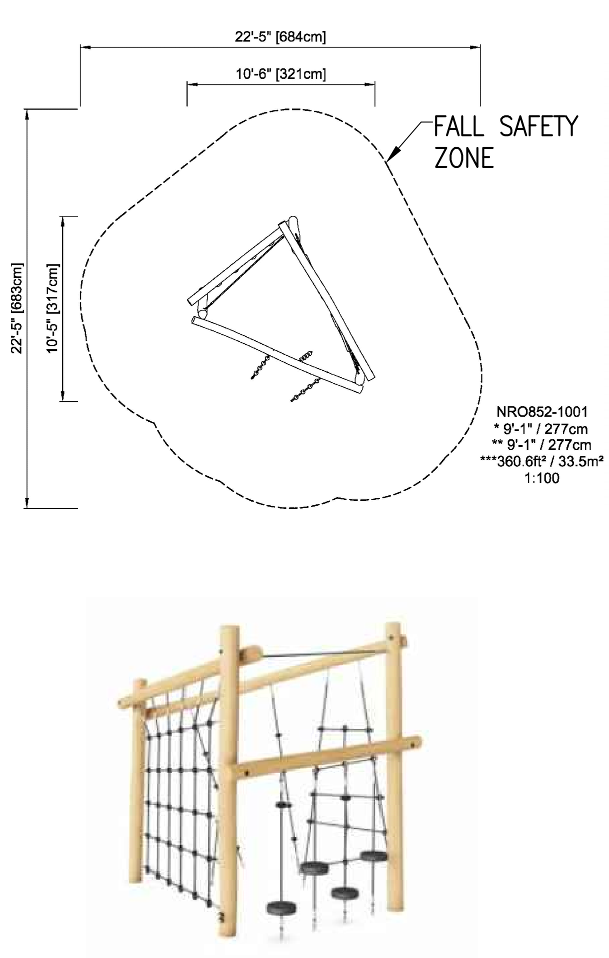
9 EQUIPMENT POST FOOTING
SCALE: 3/4" = 1'-0"



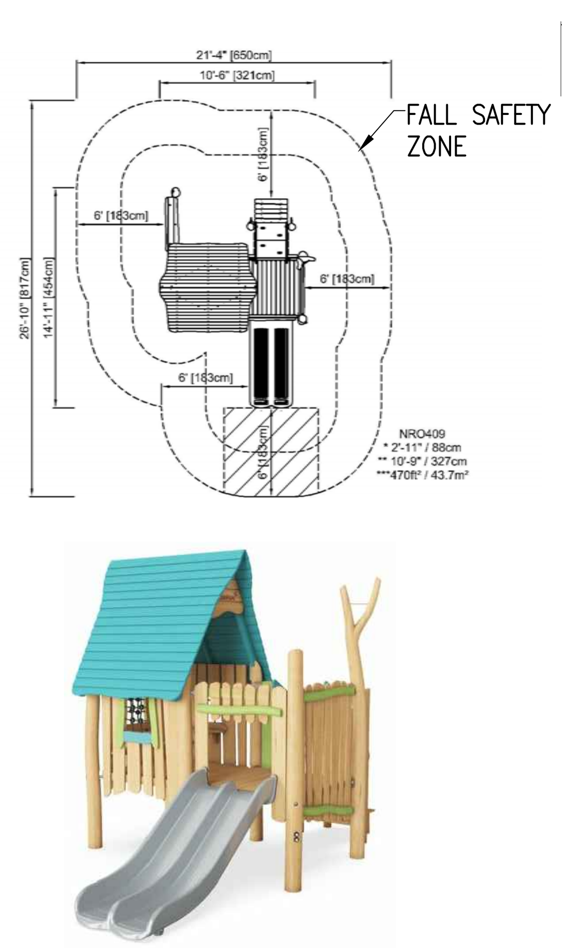
PLAY STRUCTURE 1



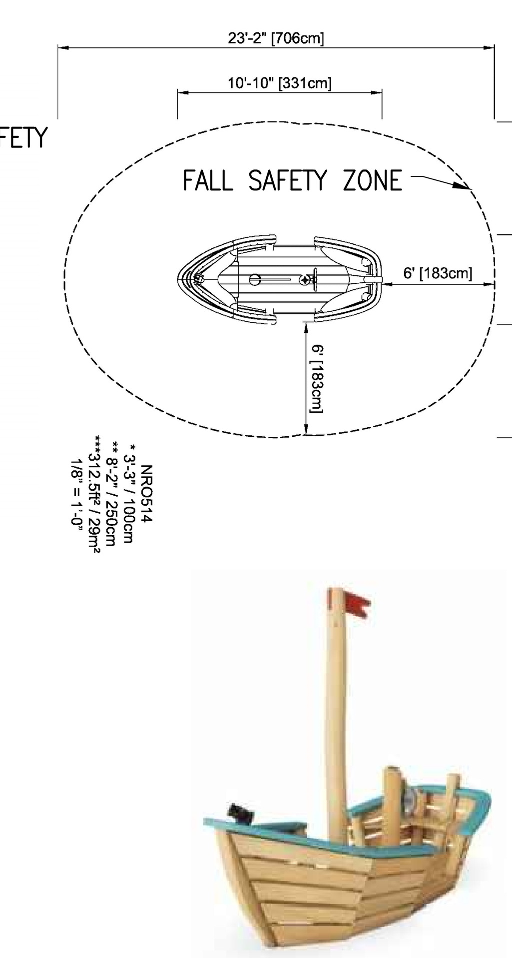
PLAY STRUCTURE 2



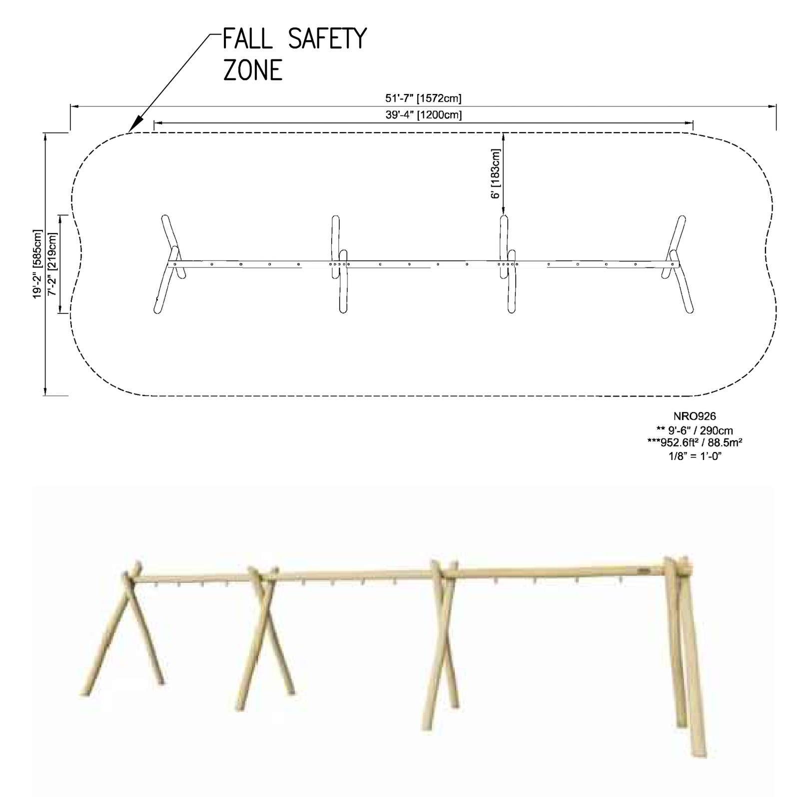
PLAY STRUCTURE 3



PLAY STRUCTURE 4



WOODEN SAILBOAT



SWING FRAME – 3 BAYS

NOTE:
- POSTS AND BEAMS TO BE ROBINIA WOOD
- ALL CHAINS AND HARDWARE TO BE STAINLESS STEEL
- SWINGS TO INCLUDE (4) BELT SWINGS, (1) TODDLER SEAT, AND (1) GROUP ROPE CHAIR, SEE SPEC.

EMBANKMENT SLIDE– HDPE.
SEE SPECS FOR COLORS

SPRING RIDER

SEE 9 LD1.8 FOR EQUIPMENT POST FOOTING

NOTE:
- SEE SPEC FOR EQUIPMENT FINISHES AND COLORS
- INSTALLED PLAY SURFACE SHALL MEET OR EXCEED CPSC PERFORMANCE GUIDELINES WITH RESPECT TO CRITICAL FALL HEIGHTS OF THE IN-PLACE PLAY EQUIPMENT.

3 PLAY EQUIPMENT
SCALE: N.T.S.

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO.	REVISION	DATE

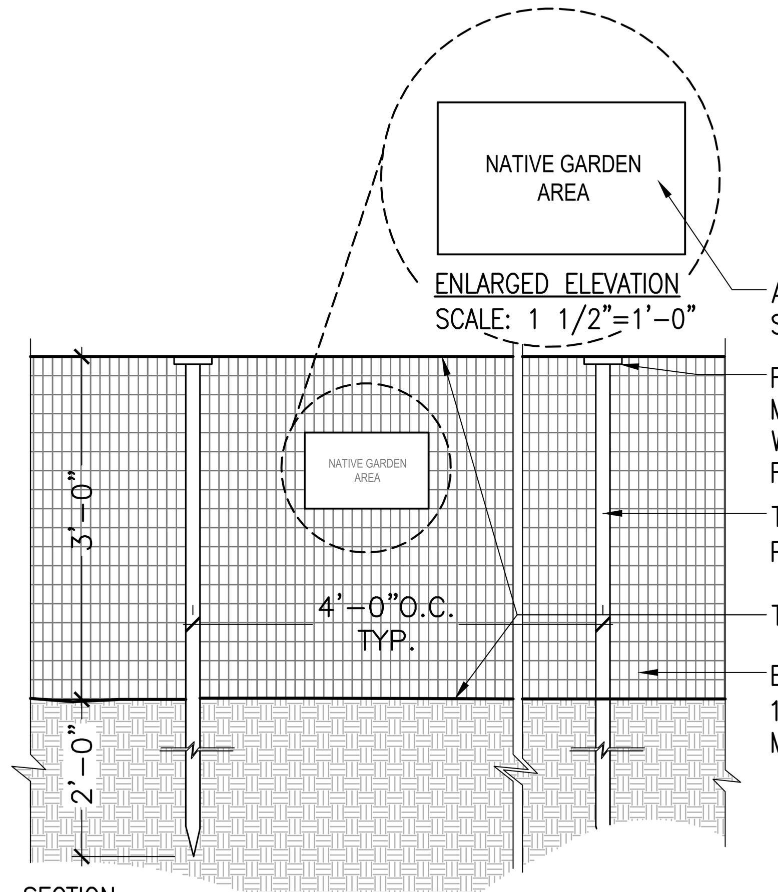
kzla
Kyle Zick Landscape Architecture, Inc.
36 Bromfield Street Suite 202
Boston, MA 02108
617 451-1018 Tel
www.kylezick.com

100% DESIGN DEVELOPMENT SET

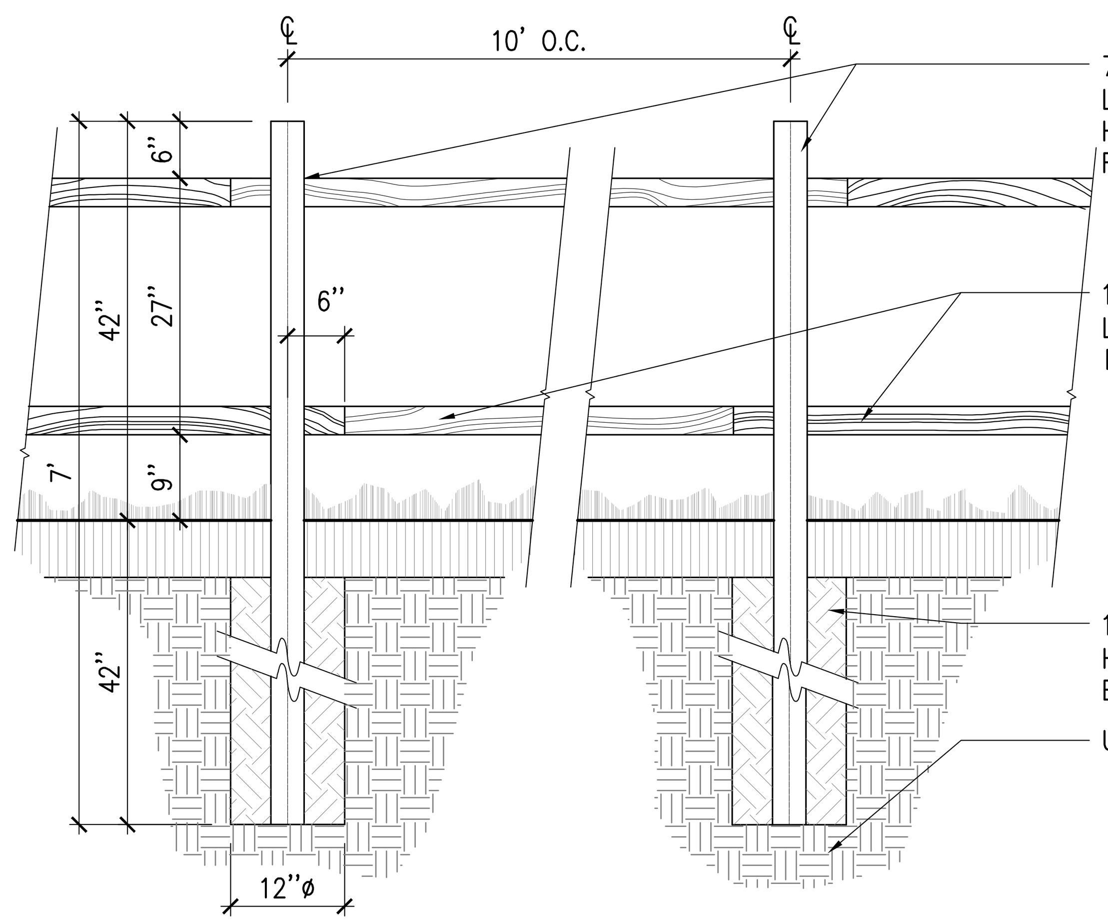
Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB | Checked By: KZ
Date: NOVEMBER 13, 2020
Scale: AS SHOWN
Drawing Title:

DETAILS

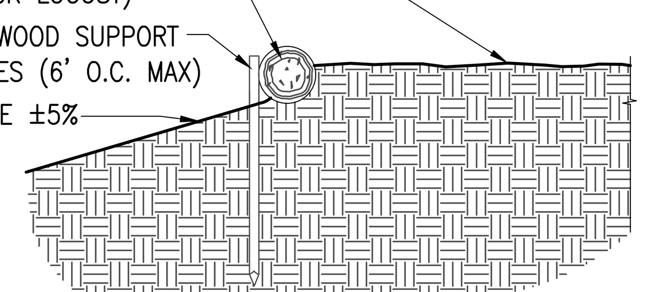
LD1.8



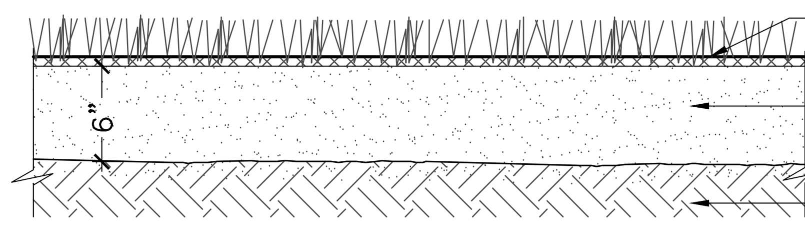
1 NATIVE GARDEN PROTECTIVE FENCE
SCALE: 3/4" = 1'-0"



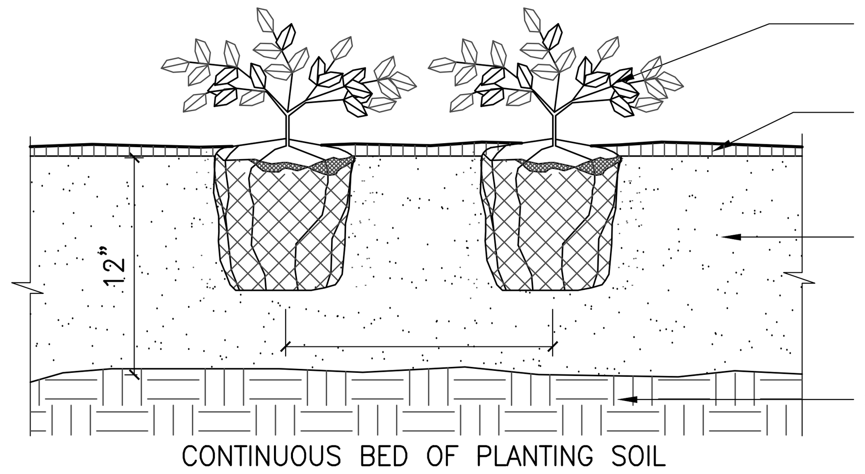
2 SPLIT RAIL FENCE
SCALE: 3/4" = 1'-0"



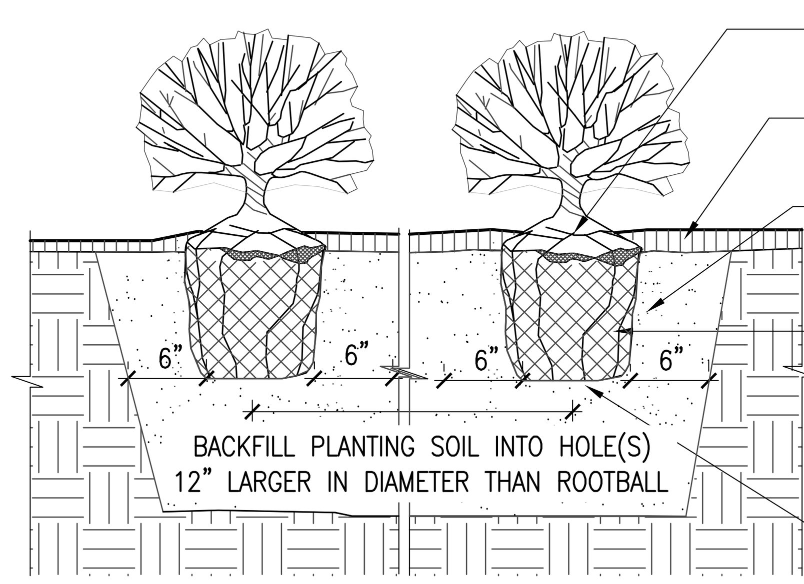
3 TRAIL CRIBBING/ WATER DAM
SCALE: 3/4" = 1'-0"



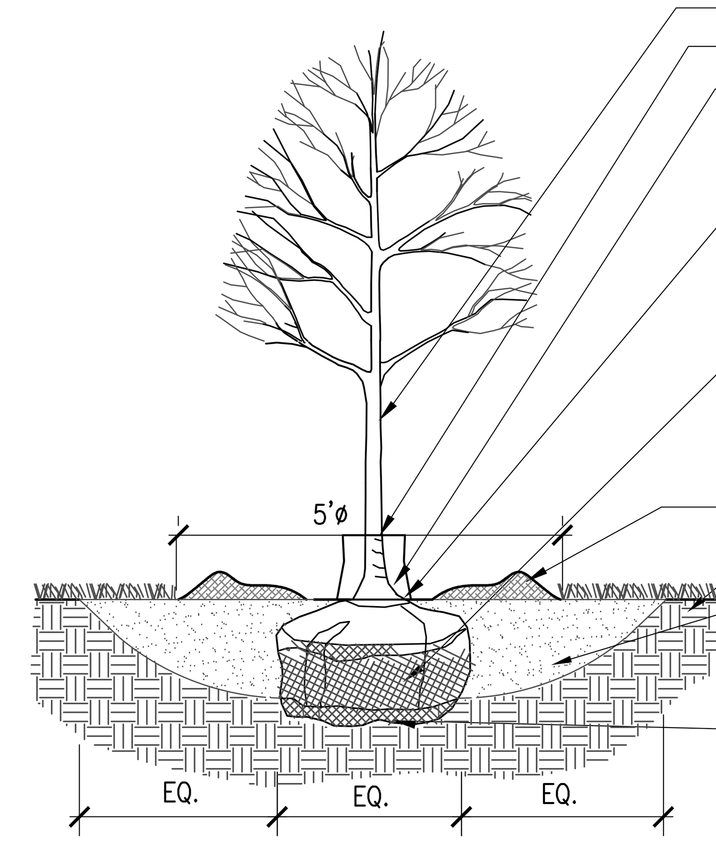
4 SEEDING
SCALE: 1 1/2" = 1'-0"



5 PERENNIAL PLANTING
SCALE: 1 1/2" = 1'-0"

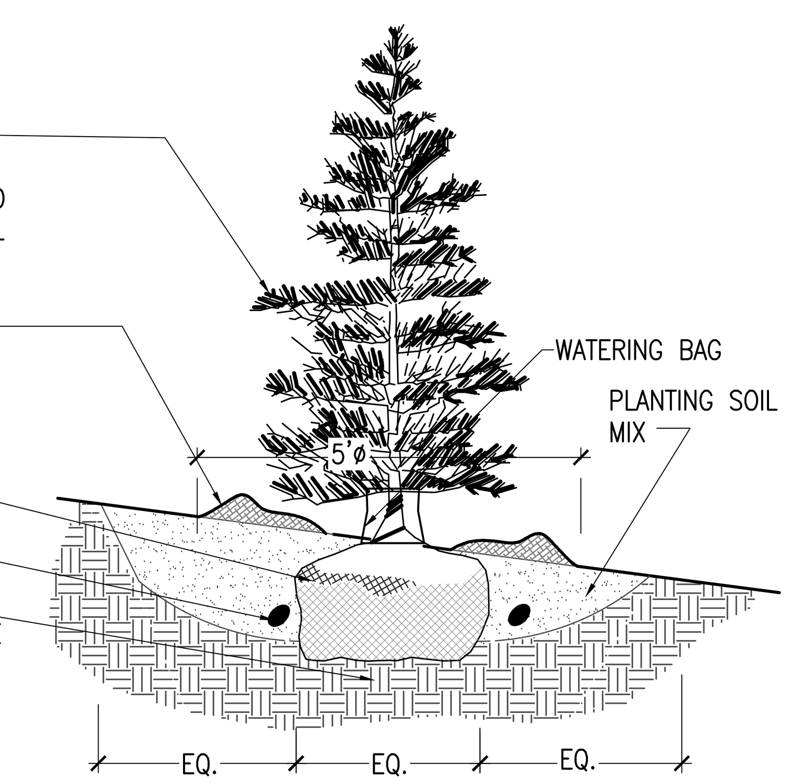


6 SHRUB PLANTING
SCALE: 1 1/2" = 1'-0"



NOTES
1. IF CONTAINER GROWN SCARIFY SOIL AND ROOTS TO REMOVE CIRCLING ROOTS

7 DECIDUOUS TREE
SCALE: N.T.S.



8 EVERGREEN TREE
SCALE: N.T.S.

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO.	REVISION	DATE

kzla
Kyle Zick Landscape Architecture, Inc.
36 Bromfield Street Suite 202 617 451-1018 Tel
Boston, MA 02108 www.kylezick.com

MASSACHUSETTS KYLE S. ZICK No. 1150 REGISTERED LANDSCAPE ARCHITECT

100% DESIGN DEVELOPMENT SET

Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB Checked By: KZ
Date: NOVEMBER 13, 2020
Scale: AS SHOWN
Drawing Title:

DETAILS

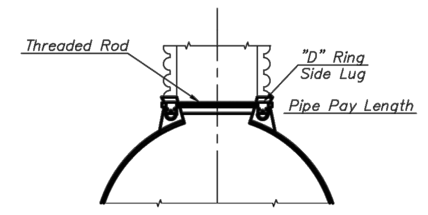
LD1.9

END SECTIONS FOR HDPE PIPE								
Dia.	Gauge	Weight	* A	* H	* L	* W	Slope	Overall Width
6"	18	10	4	3	8	12	2	20"
8"	18	14	5 3/4	4	14 1/2	16	2 1/4	27 1/2"
10"	18	17	7 5/8	6	14 1/2	20	2 1/2	35 1/4"
12"	16	25	7	6	21	24	2 1/2	38"
15"	16	33	8	6	26	30	2 1/2	46"
18"	16	42	8	6	31	36	2 1/2	52"
21"	16	49	9	6	36	42	2 1/2	60"
24"	16	65	10	6	41	48	2 1/2	68"
30"	14	123	12	8	51	60	2 1/2	84"
36"	14	135	14	9	60	72	2 1/2	100"
42"	12	320	16	11	69	84	2 1/2	116"
48"	12	375	18	12	78	90	2 1/4	126"
54"	12	440	18	12	84	102	2 1/4	138"
60"	12/10	610	18	12	87	114	2	150"

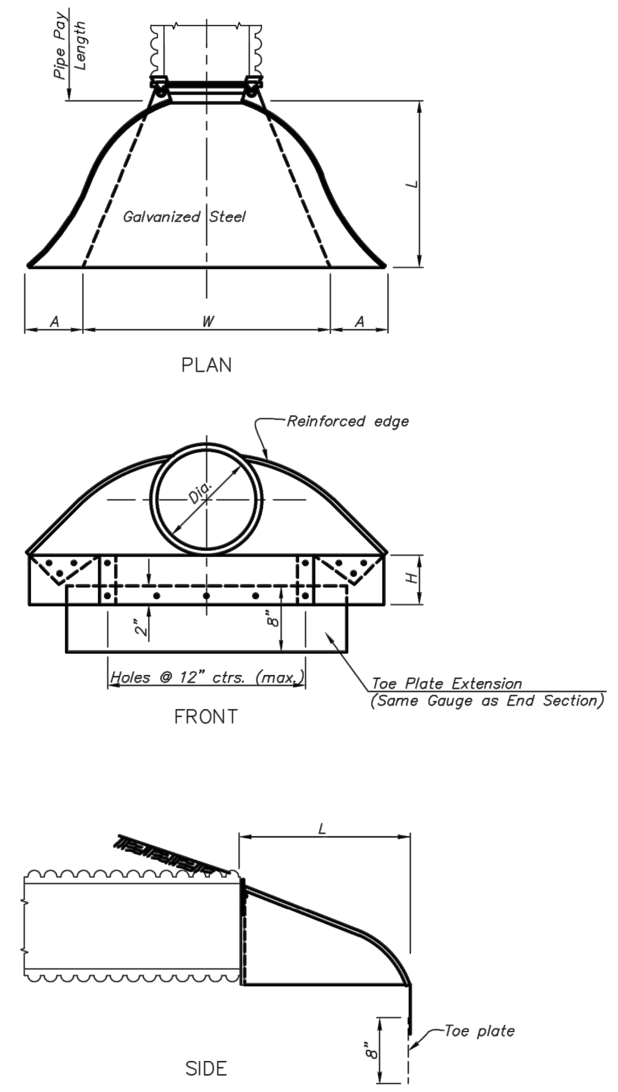
Toe plate extensions where specified, to be punched to match holes in apron lip. 3/8" bolts to be furnished. The length of toe plate to be as follows: W + 10" for 12" to 30" diameter pipes inclusive. W + 20" for 36" to 60" diameter pipes inclusive.

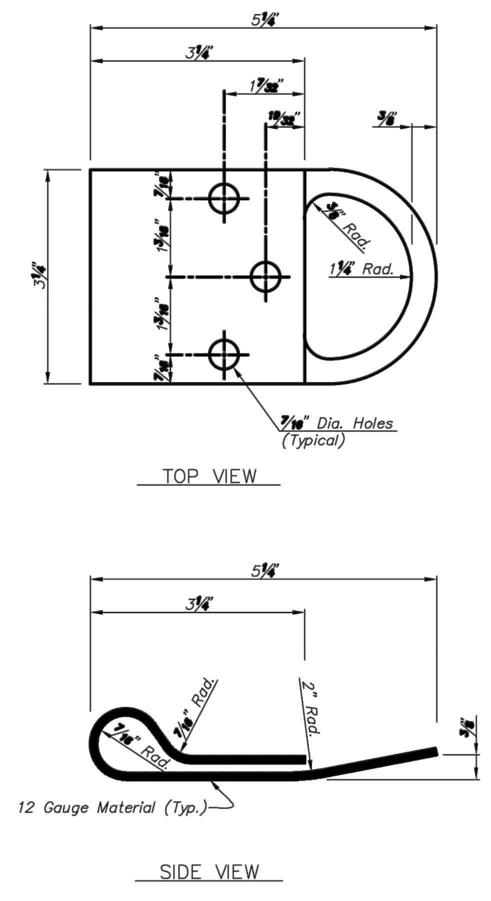
Multiple panel end sections shall have lap seams which are to be tightly jointed by bolts. Corner plate, and toe plate to be same gauge as end section.

** – Dimensions in Inches Plus or Minus Standard Shop Tolerance.*



TYPE 2 CONNECTIONS
(12" & Larger)

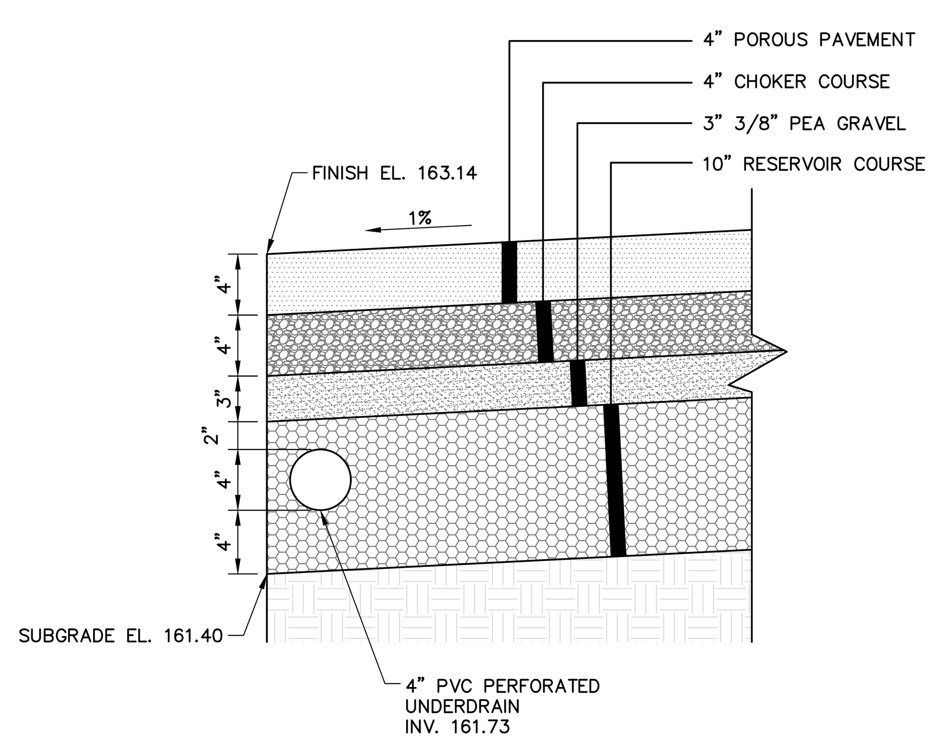




"D" RING SIDE LUG
TYPE 2 ATTACHMENT DETAILS

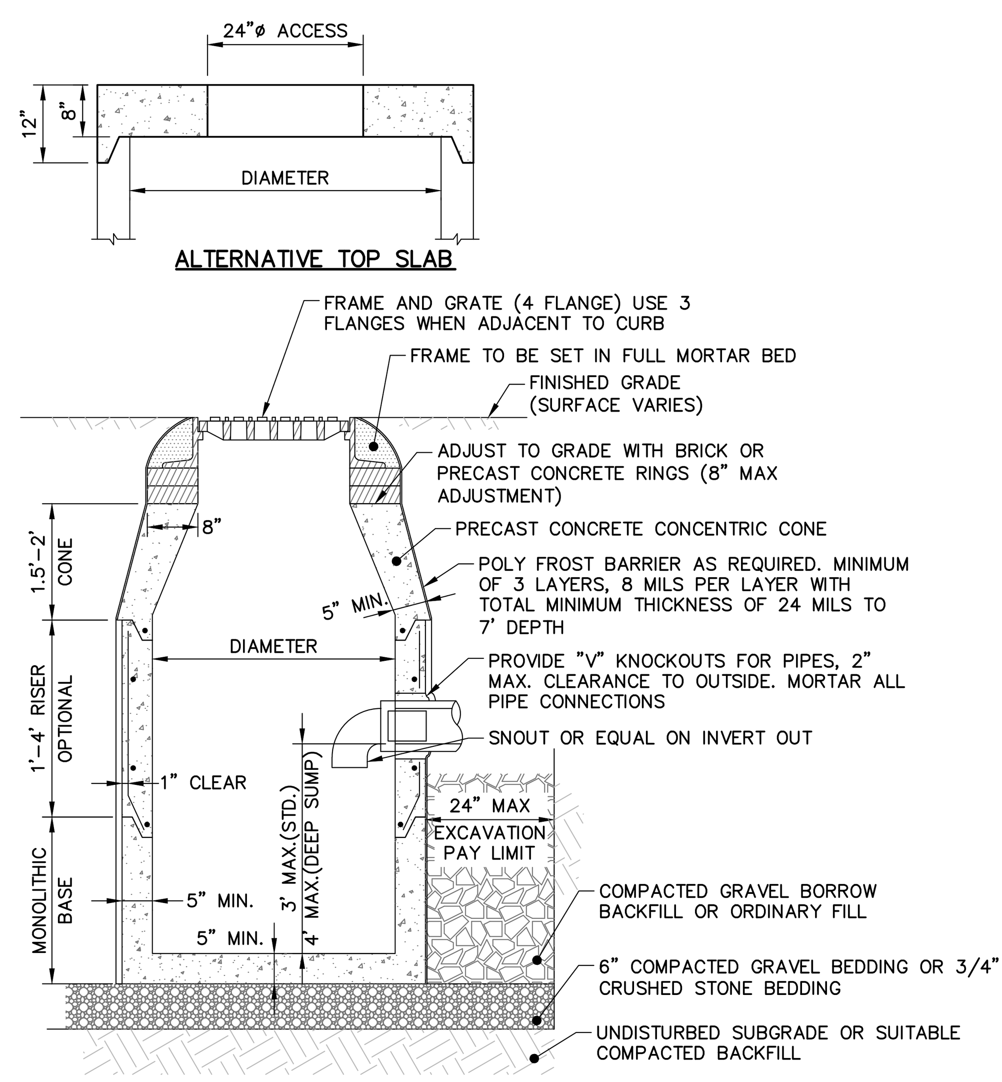
FLARED PIPE END DETAIL

N.T.S.



POROUS PAVEMENT SECTION

N.T.S.

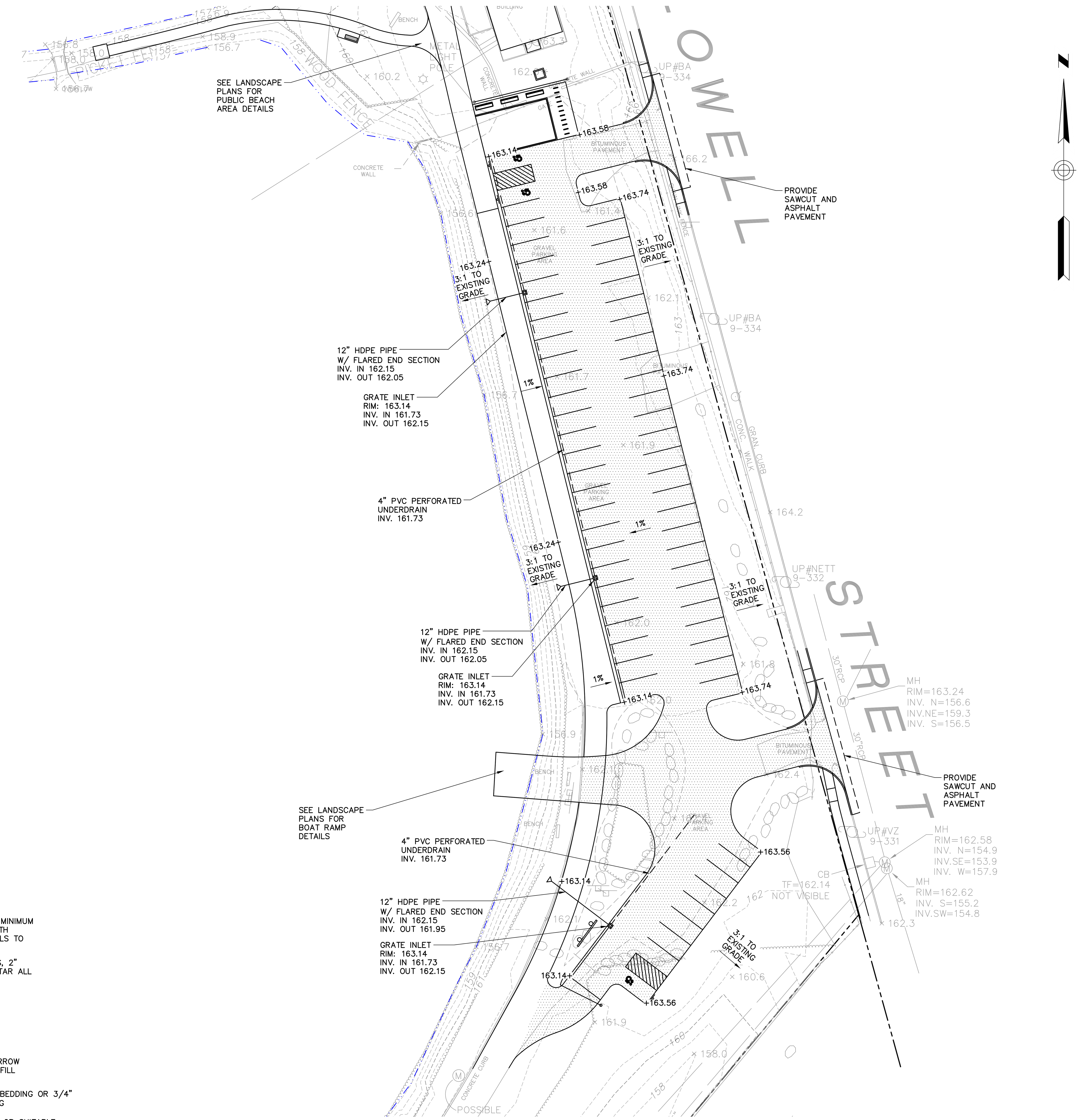


NOTES:

1. PRECAST CONCRETE STRUCTURES AND CASTINGS SHALL BE SUITABLE FOR HS-20 LOADINGS.
2. PRECAST CONCRETE STRUCTURES SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C-478.
3. ALTERNATE TOP SLAB MAY BE USED AS DICTATED BY DESIGN AND/OR FIELD CONDITIONS.
4. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE BUTYL RUBBER.
5. CATCH BASIN FRAME AND GRATE(S) SHALL MEET MUNICIPAL AND STATE SPECIFICATIONS WHEN APPLICABLE.

PRECAST CONCRETE CATCH BASIN

NOT TO SCALE



30' 0 30' 60'
BAR SCALE
1" = 30'
CHECK GRAPHIC SCALE BEFORE USING

NOT FOR CONSTRUCTION

24x36 SHEET
1:1

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COMMITMENT & INTEGRITY DRIVE RESULTS

COMMONWEALTH OF MASSACHUSETTS
DENISE L. CAMERON
CIVIL
No. 53048
REGISTERED PROFESSIONAL ENGINEER

REV	DESCRIPTION	DATE

DESIGNED BY: LT | CHECKED BY: BM
DRAWN BY: BCM | 0233115.00 – C-1.dwg

DRAINAGE PLAN

TOWN OF ARLINGTON
ARLINGTON, MASSACHUSETTS

ARLINGTON RESERVOIR PHASE 2

JOB NO.: 0233115.00
DATE: NOVEMBER 2020
SCALE: 1"=30'
SHEET: 1 OF 2

C1.0

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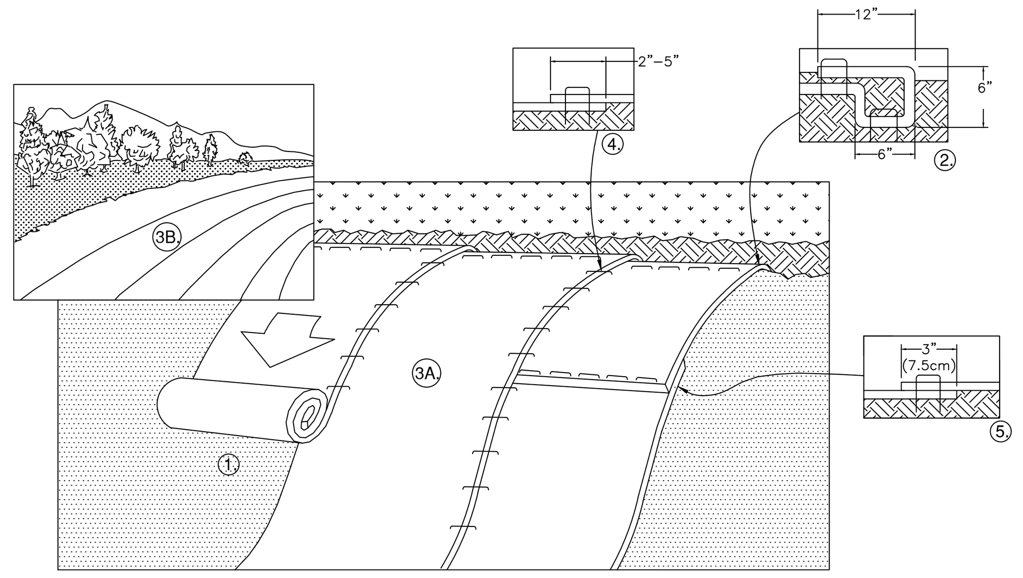
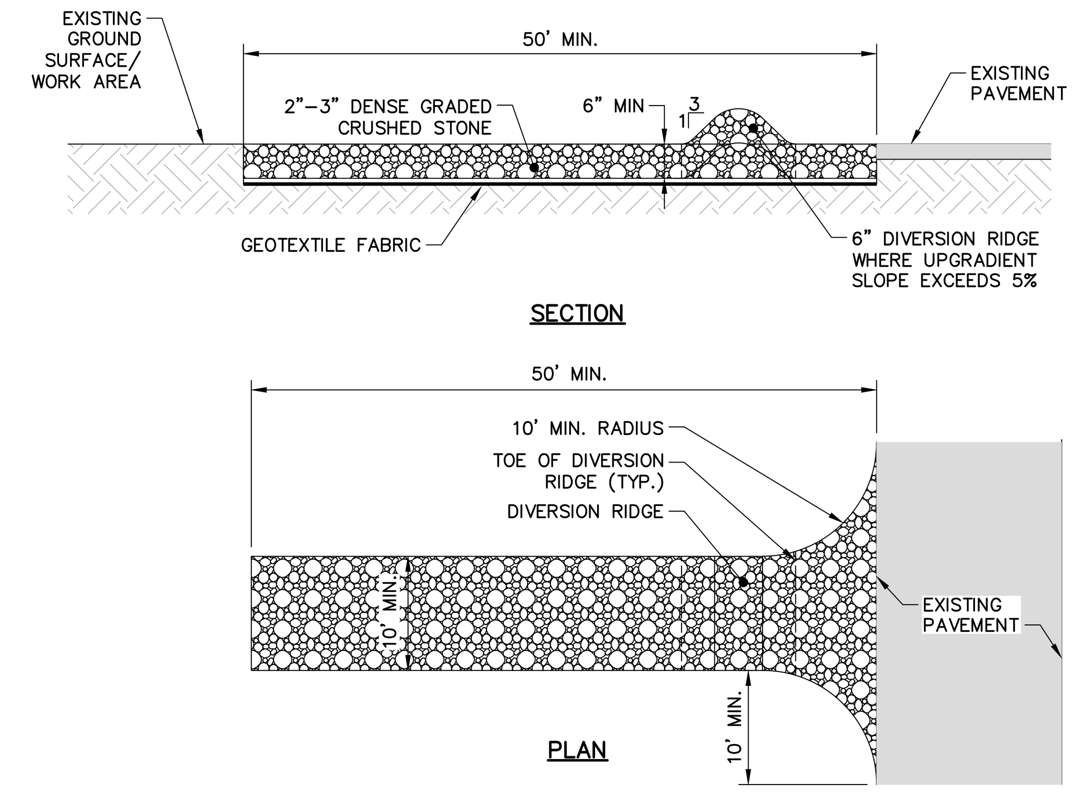


1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED AS WELL AS REMOVING ANY PROTRUDING ROCKS, STUMPS OR ROOTS. DURING THE GROWING SEASON (APRIL 15–SEPTEMBER 15) USE RECP'S ON THE BASE OF GRASSED WATERWAYS, SOIL SLOPES HAVING A GRADE GREATER THAT 15%, OR ANYWHERE WHERE HAY MULCH HAS PROVEN TO BE INEFFECTIVE AT CONTROLLING SHEET EROSION. RECP'S ARE A MANUFACTURED COMBINATION OF MULCH AND NETTING DESIGNED TO PREVENT EROSION AND RETAIN SOIL MOISTURE. FOR OVER WINTER PROTECTION, APPLY RECP'S ON THE BASE AND SIDE SLOPES OF GRASSED WATERWAYS AND ON SLOPES STEEPER THAN AN 8% GRADE.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECP's IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF RECP's EXTENDED BEYOND THE UP–SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF RECP's BACK OVER SEED AND COMPACTED SOIL. SECURE RECP's OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE RECP's.
3. ROLL THE RECP's (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL RECP's MUST BE STAPLED WITH APPROXIMATELY 2" – 5" OVERLAP DEPENDING ON RECP's TYPE.
5. CONSECUTIVE RECP's SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE RECP's WIDTH. NOTE: *IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY SECURE THE RECP's.
6. UNTIL GRASS IS ABUNDANT, INSPECT PERIODICALLY AND AFTER EACH RAINSTORM TO CHECK FOR EROSION. IMMEDIATELY REPAIR AND ADD MORE MULCH UNTIL GRASSES ARE FIRMLY ESTABLISHED. DO NOT MOW THE FIRST YEAR.

ROLLED EROSION CONTROL MATTING

N.T.S.

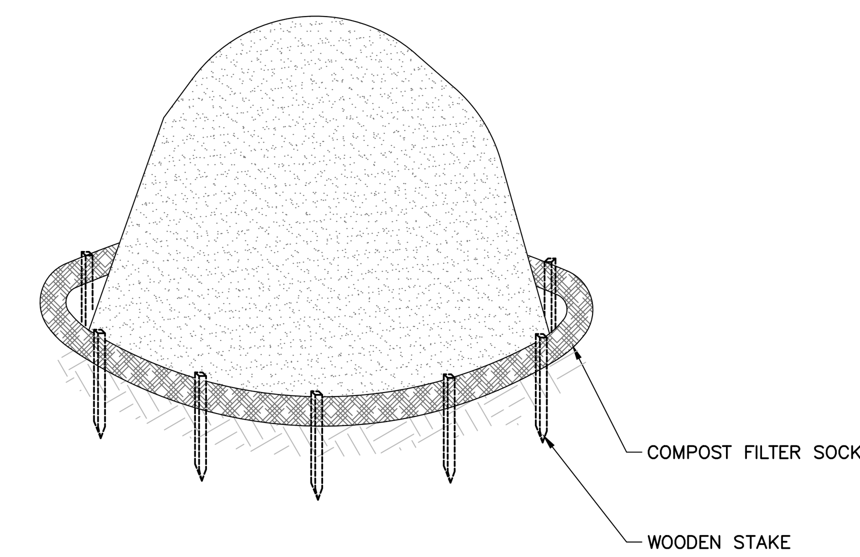


NOTES:

1. GRADE TOWARDS SEDIMENT BARRIER WHEN NECESSARY TO MANAGE FLOW.
2. INCREASE MINIMUM LENGTH TO 100' WHERE TRACKED SEDIMENTS CONTAIN LESS THAN 80% SAND OR AS NECESSARY FOR HEAVY CONSTRUCTION.

STABILIZED CONSTRUCTION ENTRANCE/EXIT

N.T.S.



NOTES:

1. STOCKPILES SHALL BE SURROUNDED BY COMPOST FILTER SOCKS.
2. STOCKPILES SHALL HAVE A MAXIMUM 2:1 (H:V) SIDE SLOPE.
3. REPAIR OR REPLACE DAMAGED COMPOST FILTER SOCKS DUE TO CONSTRUCTION ACTIVITIES OR STOCKPILE MITIGATION.

TEMPORARY SOIL STOCKPILE

N.T.S.

30' 0 30' 60'
BAR SCALE
1" = 30'
CHECK GRAPHIC SCALE BEFORE USING

NOT FOR CONSTRUCTION

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Andover, Massachusetts 01810
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COMMITMENT & INTEGRITY DRIVE RESULTS

COMMONWEALTH OF MASSACHUSETTS
DENISE L. CAMERON
CIVIL
No. 53548
REGISTERED PROFESSIONAL ENGINEER

REV	DESCRIPTION	DATE

DESIGNED BY: LT
DRAWN BY: BCM
CHECKED BY: BM
0233115.00 – C-1.dwg

EROSION & SEDIMENT CONTROL DETAILS

TOWN OF ARLINGTON
ARLINGTON, MASSACHUSETTS

ARLINGTON RESERVOIR
PHASE 2

JOB NO.: 0233115.00
DATE: NOVEMBER 2020
SCALE: 1"=30'
SHEET: 2 OF 2

C2.0

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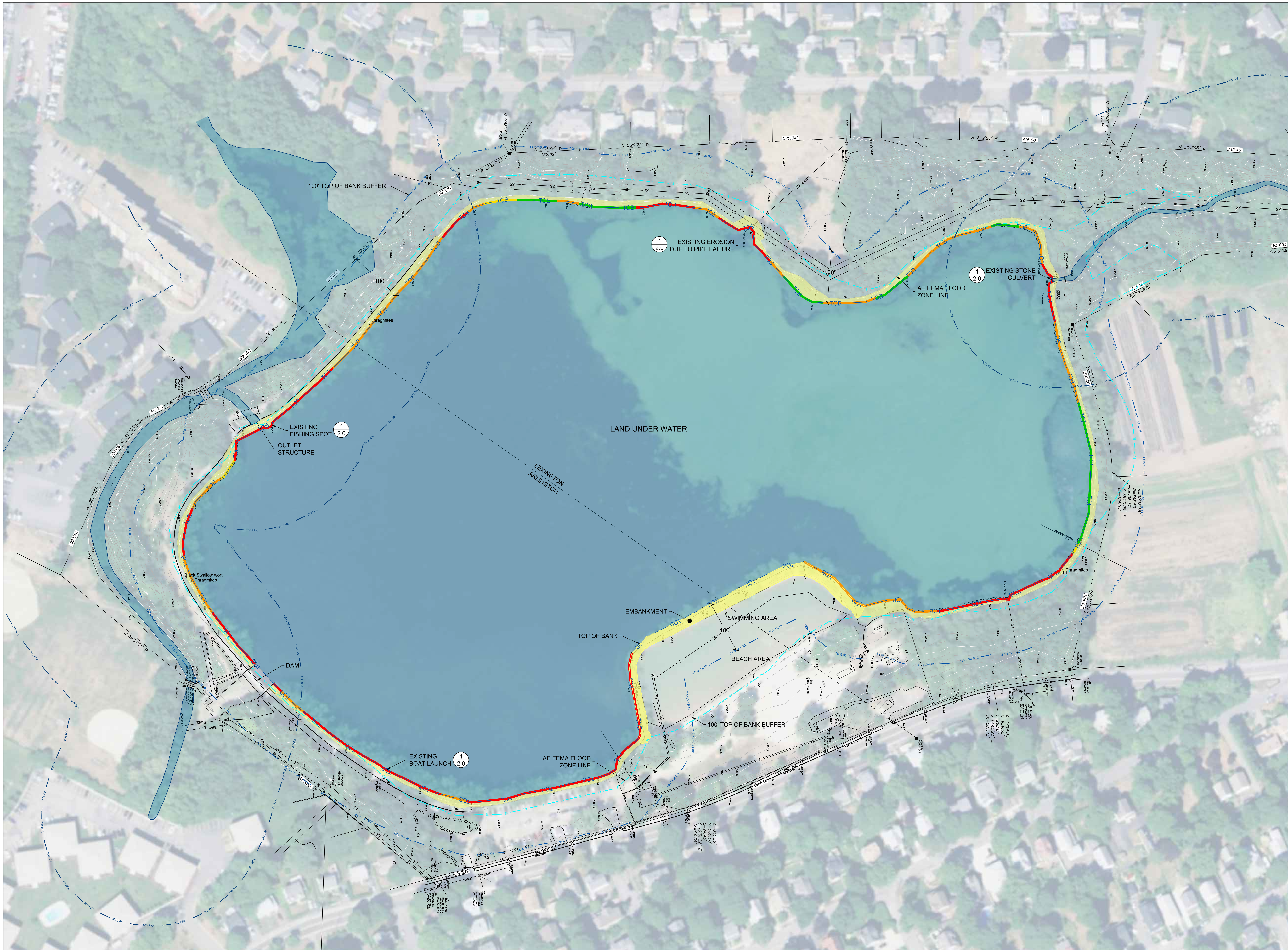


ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

LEGEND

- PROPERTY LINES
- EX. MAJOR CONTOUR (5' INTERVAL)
- EX. MINOR CONTOUR (1' INTERVAL)
- TOP OF BANK
- 100' TOP OF BANK BUFFER
- 200' RIVERFRONT AREA
- AREA 'A' BANK RESTORATION: > 12" VERTICAL BANK CUT - ACTION PROPOSED
- AREA 'B' BANK RESTORATION: < 12" VERTICAL BANK CUT - ACTION PROPOSED
- AREA 'C' BANK RESTORATION: STABLE SLOPE - REVEGETATION PROPOSED
- AREA 'D' BANK RESTORATION: STABLE SLOPE - NO ACTION PROPOSED
- AE FLOOD ZONE: 1% ANNUAL CHANCE OF FLOODING, WITH BASE FLOOD ELEVATION
- EMBANKMENT
- SIGNIFICANT INVASIVE POPULATION AREA

ANSI D (22"x34") SCALE: 1"=80'
TABLOID (11"x17") SCALE: 1"=160'

0 40 80 160

NO.	REVISION	DATE

SWCA ENVIRONMENTAL CONSULTANTS

SWCA ENVIRONMENTAL CONSULTANTS
15 RESEARCH DRIVE
AMHERST, MA 01002
(P) 413.256.0202
WWW.SWCA.COM

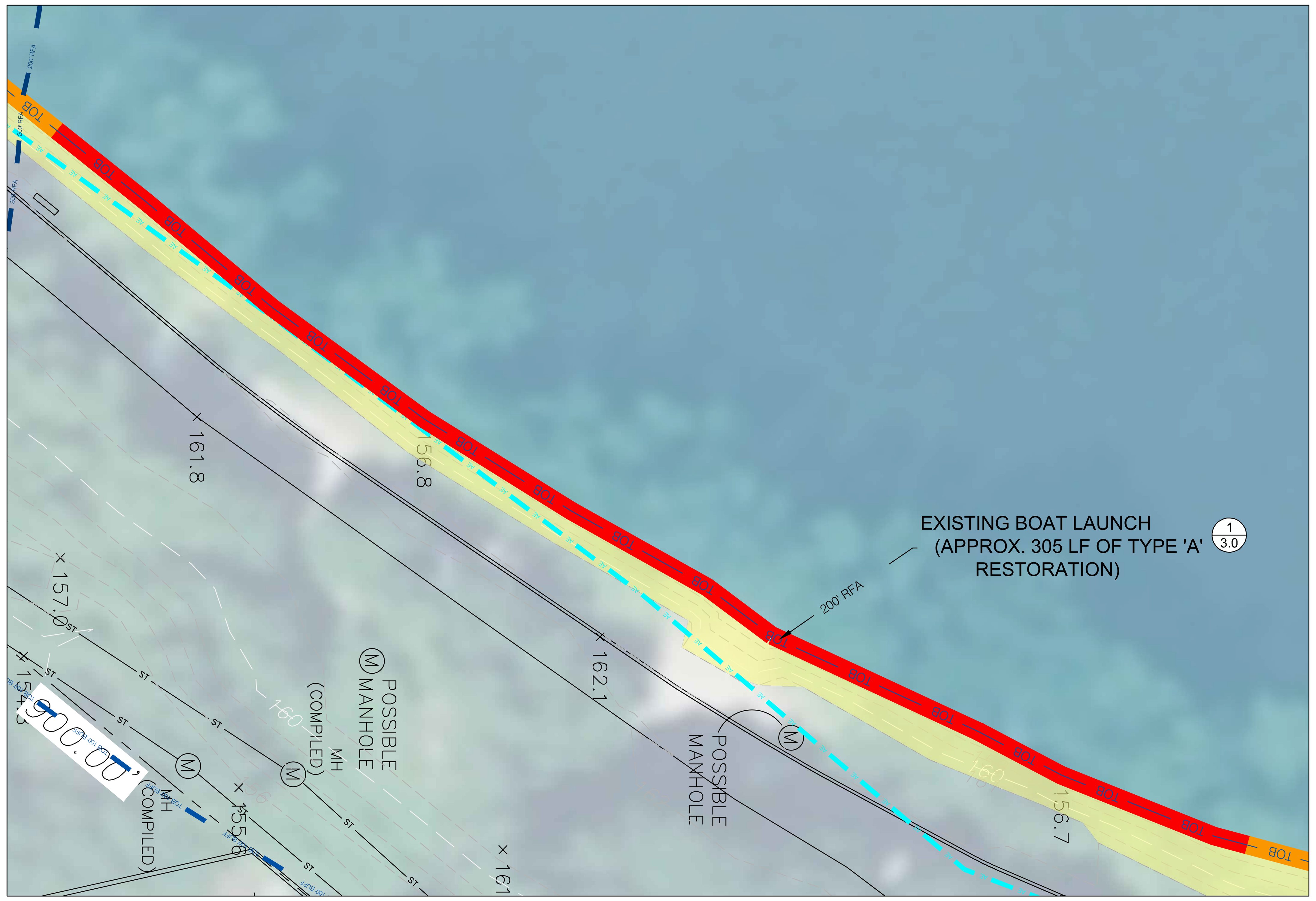
kzla
Kyle Zick Landscape Architecture, Inc.
36 Bromfield Street Suite 202
Boston, MA 02108
617 451-1018 Tel
www.kylezick.com

DESIGN DEVELOPMENT SET

Job Number:
Project: ARLINGTON RES.
Drawn By: TS Checked By: MM
Date: SEPTEMBER 29, 2020
Scale:
Drawing Title:

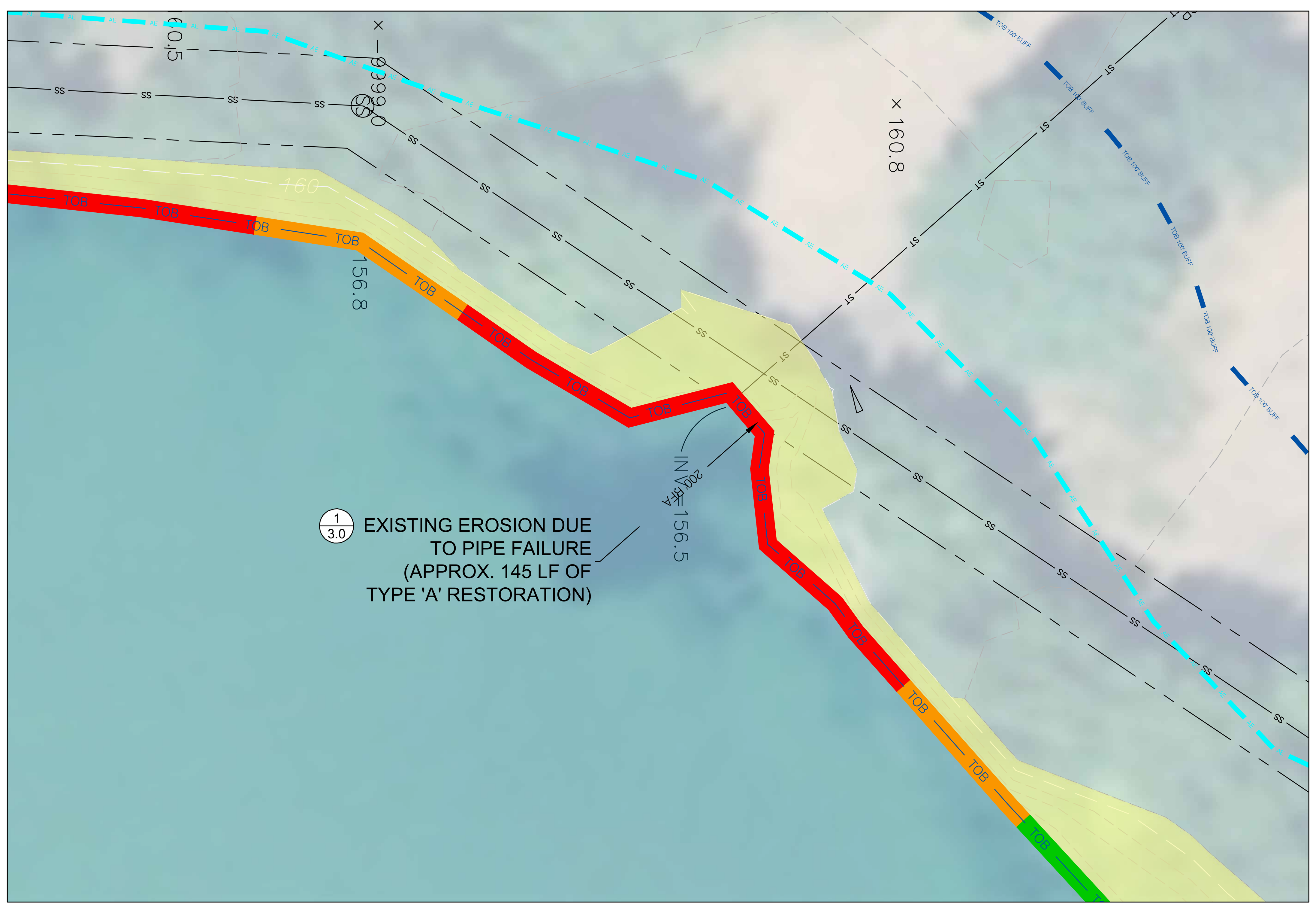
PROPOSED BANK RESTORATION AREAS

1.0



1 PHASE 1 AREA OF CONCERN: EXISTING BOAT LAUNCH
Scale: 1" = 20'

2 PHASE 1 AREA OF CONCERN: EXISTING FISHING SPOT
Scale: 1" = 20'



3 PHASE 1 AREA OF CONCERN: EXISTING EROSION DUE TO PIPE FAILURE
Scale: 1" = 20'

1 PHASE 1 AREA OF CONCERN: EXISTING BOAT LAUNCH
Scale: 1" = 20'

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

LEGEND

- PROPERTY LINES
- EX. MAJOR CONTOUR (5' INTERVAL)
- EX. MINOR CONTOUR (1' INTERVAL)
- TOP OF BANK
- 100' TOP OF BANK BUFFER
- AREA 'A' BANK RESTORATION: > 12" VERTICAL BANK CUT - ACTION PROPOSED
- AREA 'B' BANK RESTORATION: < 12" VERTICAL BANK CUT - ACTION PROPOSED
- AREA 'C' BANK RESTORATION: STABLE SLOPE - REVEGETATION PROPOSED
- AREA 'D' BANK RESTORATION: STABLE SLOPE - NO ACTION PROPOSED
- AE FLOOD ZONE: 1% ANNUAL CHANCE OF FLOODING, WITH BASE FLOOD ELEVATION
- EMBANKMENT
- SIGNIFICANT INVASIVE POPULATION AREA

ANSI D (22"x34") SCALE: 1"=20'
TABLOID (11"x17") SCALE: 1"=40'

0 10 20 40

NO.	REVISION	DATE

SWCA ENVIRONMENTAL CONSULTANTS
15 RESEARCH DRIVE
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Boston, MA 02108
617 451-1018 Tel
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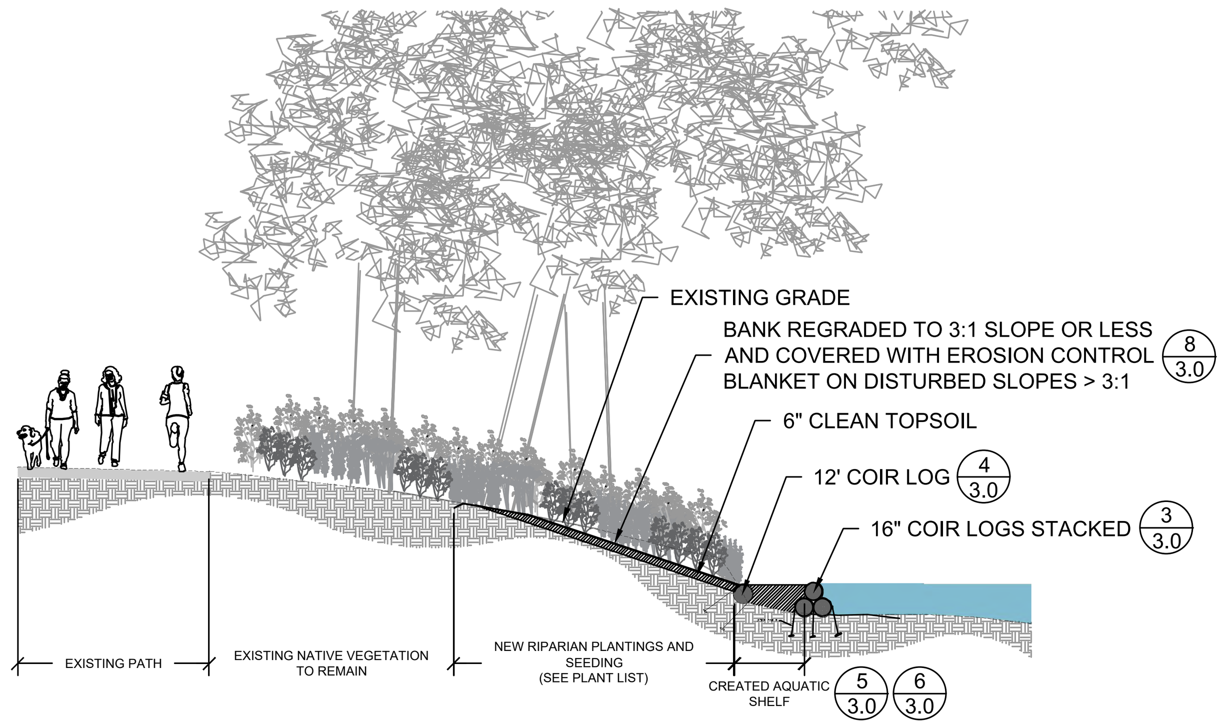
DESIGN DEVELOPMENT SET

Job Number:
Project: ARLINGTON RES.
Drawn By: TS Checked By: MM
Date: SEPTEMBER 29, 2020
Scale:
Drawing Title:

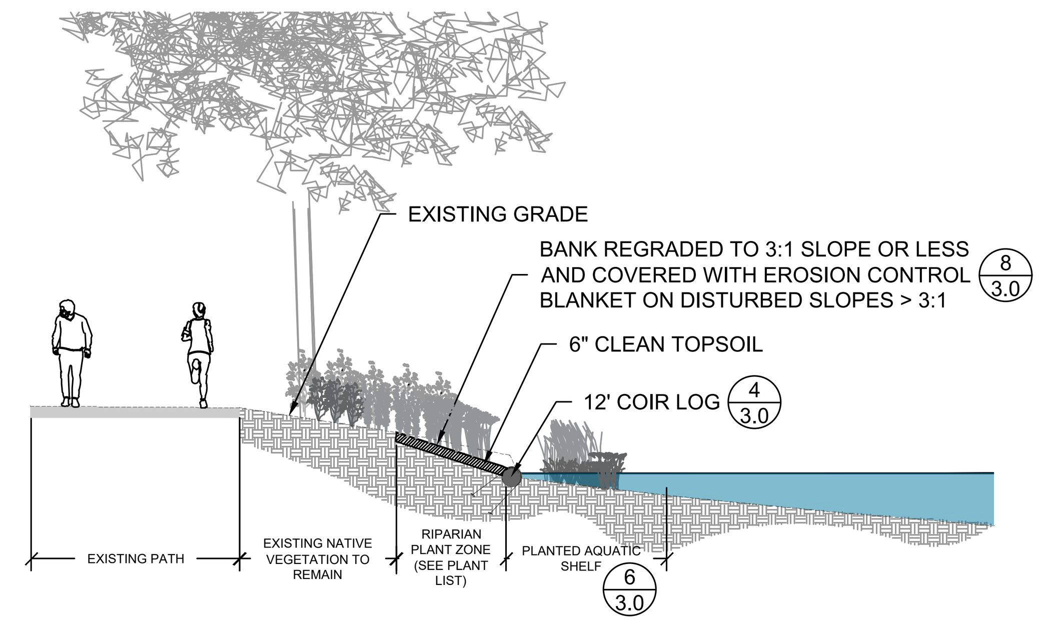
PROPOSED AREAS OF PHASE 1 BANK RESTORATION

2.0



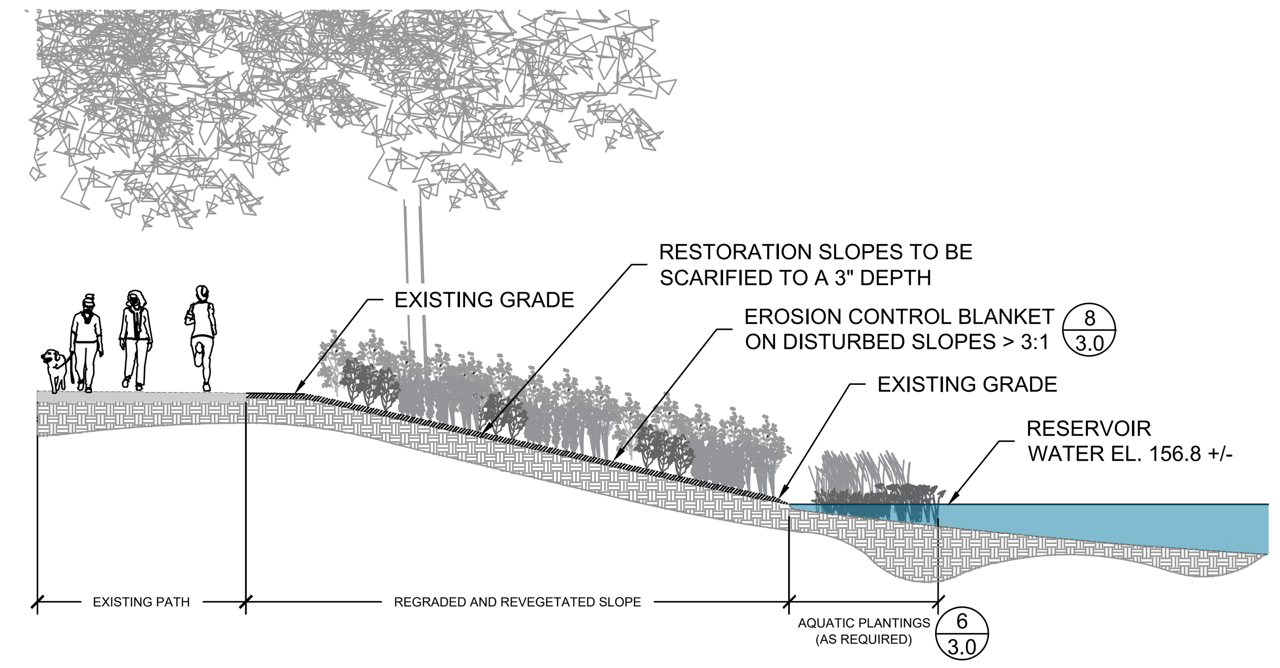
1 AREA 'A' BANK RESTORATION: > 12" VERTICAL BANK CUT (TYP.)

Scale: NTS



2 AREA 'B' BANK RESTORATION: < 12" VERTICAL BANK CUT (TYP.)

Scale: NTS



3 AREA 'C' BANK RESTORATION: STABLE SLOPE - REVEGETATION (TYP.)

Scale: NTS

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

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DESIGN DEVELOPMENT SET

Job Number:

Project: ARLINGTON RES.

Drawn By: TS | Checked By: MM

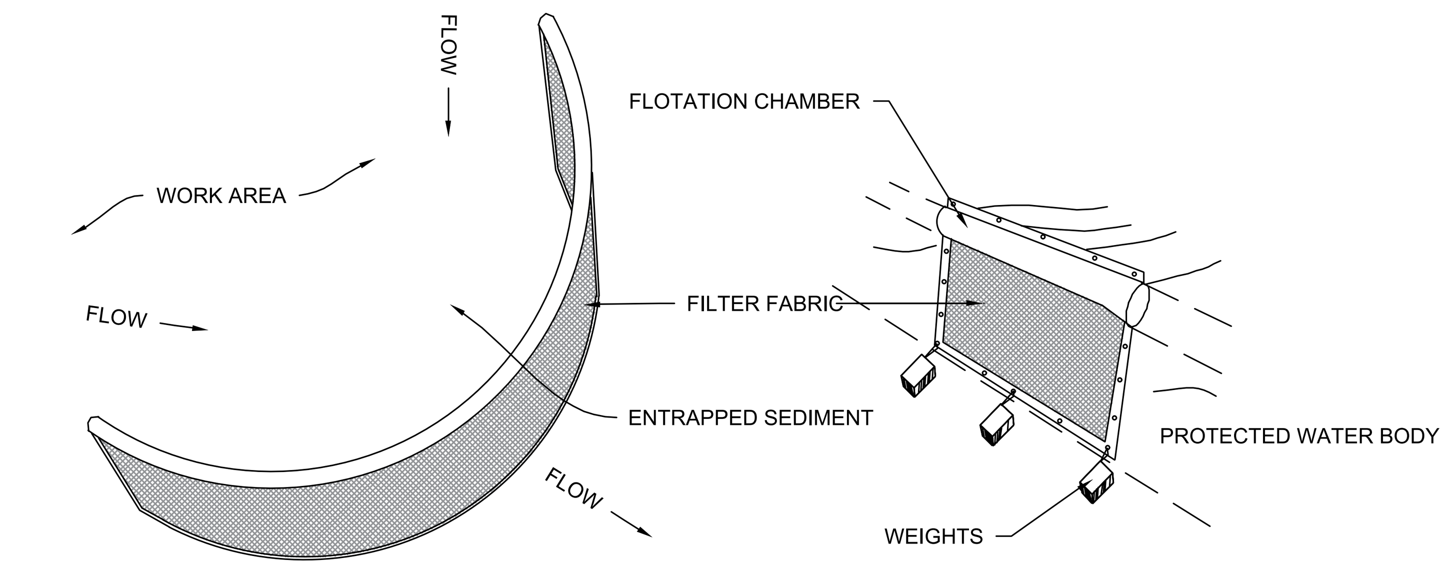
Date: SEPTEMBER 29, 2020

Scale:

Drawing Title:

BANK RESTORATION SECTIONS

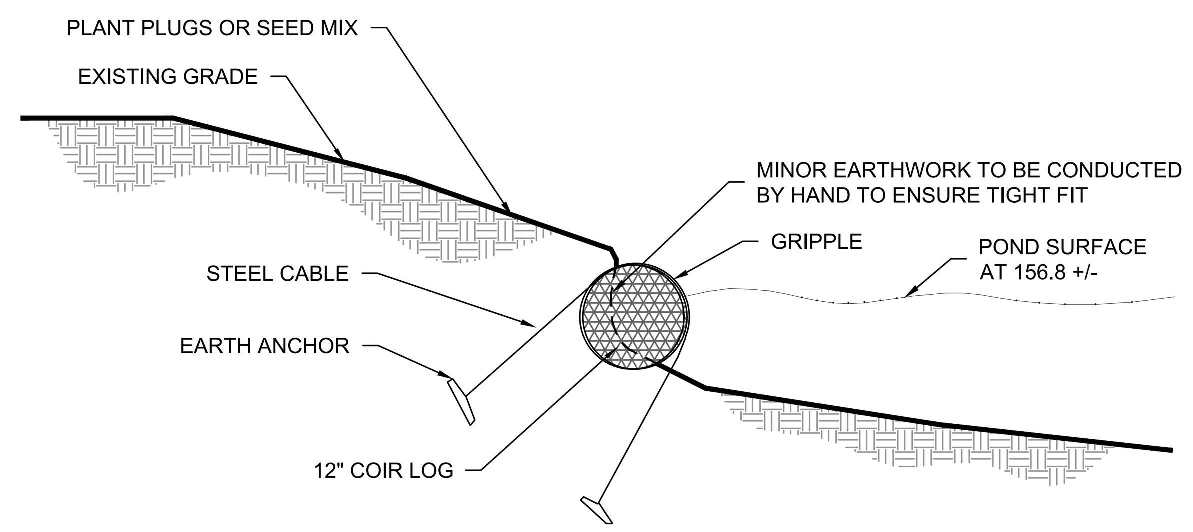
3.0



NOTE: TURBIDITY CURTAIN TO BE TEMPORARILY INSTALLED SURROUNDING ANY BANK OR BOAT RAMP WORK WHICH WILL DISTURB SOILS NEXT TO OPEN WATER. ONCE SUSPENDED SEDIMENT HAS CLEARED, THE TURBIDITY CURTAIN MAY BE REMOVED.

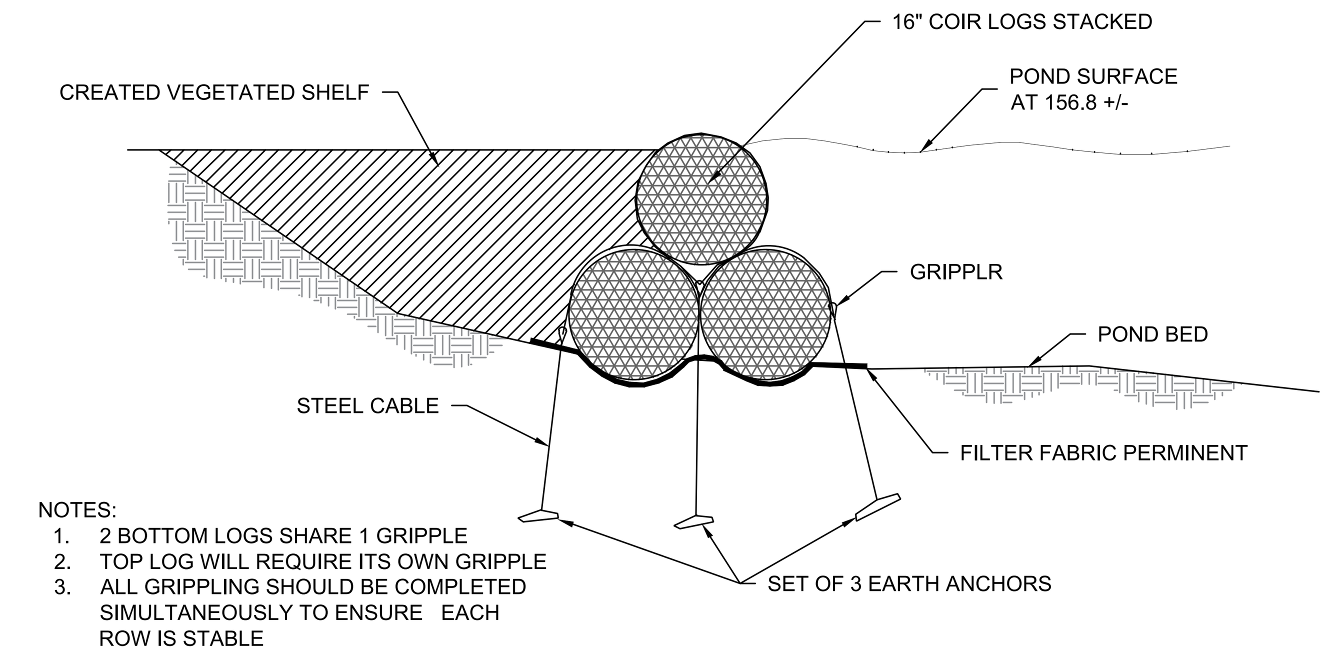
1 TURBIDITY CURTAIN DETAIL FOR IN-WATER SEDIMENT CONTROL (TYP.)

Scale: NTS



2 COIR FASCINE INSTALLATION (TYP.)

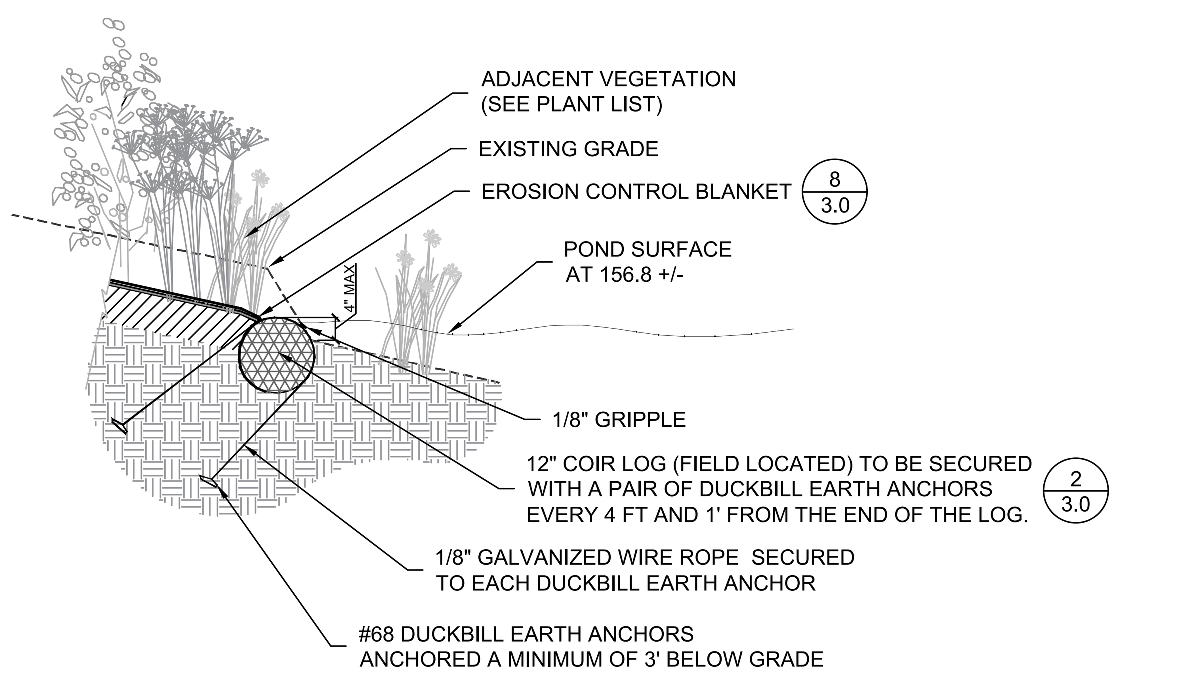
Scale: NTS



NOTES:
1. 2 BOTTOM LOGS SHARE 1 GRIPPLE
2. TOP LOG WILL REQUIRE ITS OWN GRIPPLE
3. ALL GRIPPLING SHOULD BE COMPLETED SIMULTANEOUSLY TO ENSURE EACH ROW IS STABLE

3 COIR FASCINE INSTALLATION FOR BERM (TYP.)

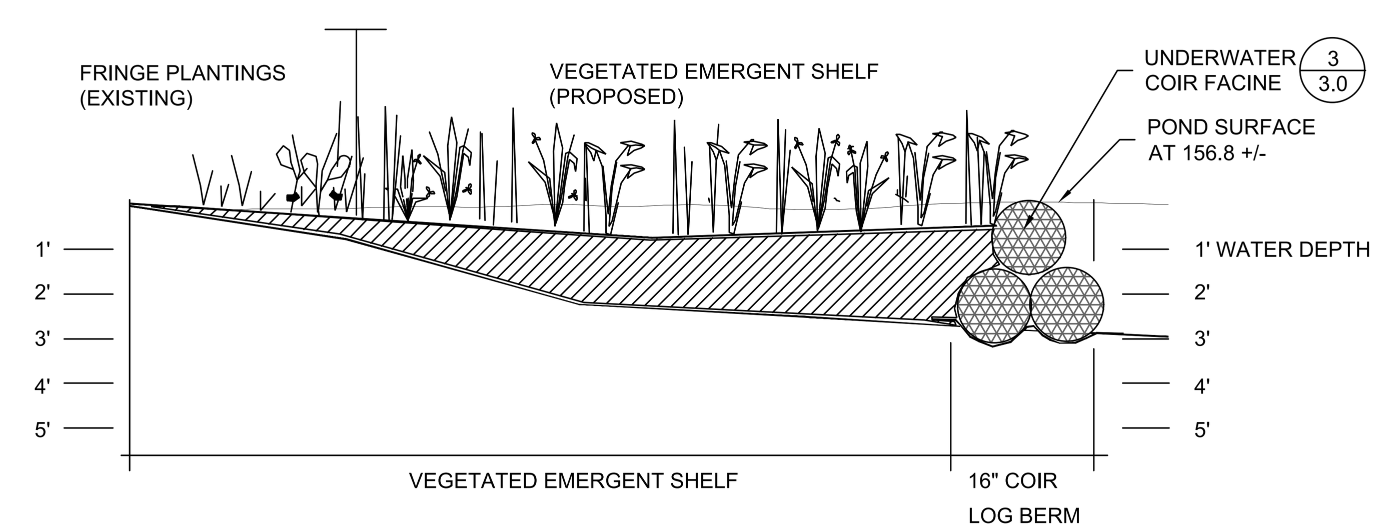
Scale: NTS



NOTES:
1. LOOP A 1/8" ZINC COATED WIRE THROUGH THE LOOP ENDS OF EACH DUCKBILL EARTH ANCHOR AND USE A 1/8" GRIPPLE WIRE TO SECURE THE LOOP. TIGHTEN GRIPPLE LOOP TO ENSURE A TIGHT FIT.
2. COIR LOGS MAY BE STACKED ON TOP OF EACH OTHER IN AREAS WITH A VERTICAL ERODED FACE OF OVER 2'-0" AS DIRECTED BY THE PROJECT DESIGNER.

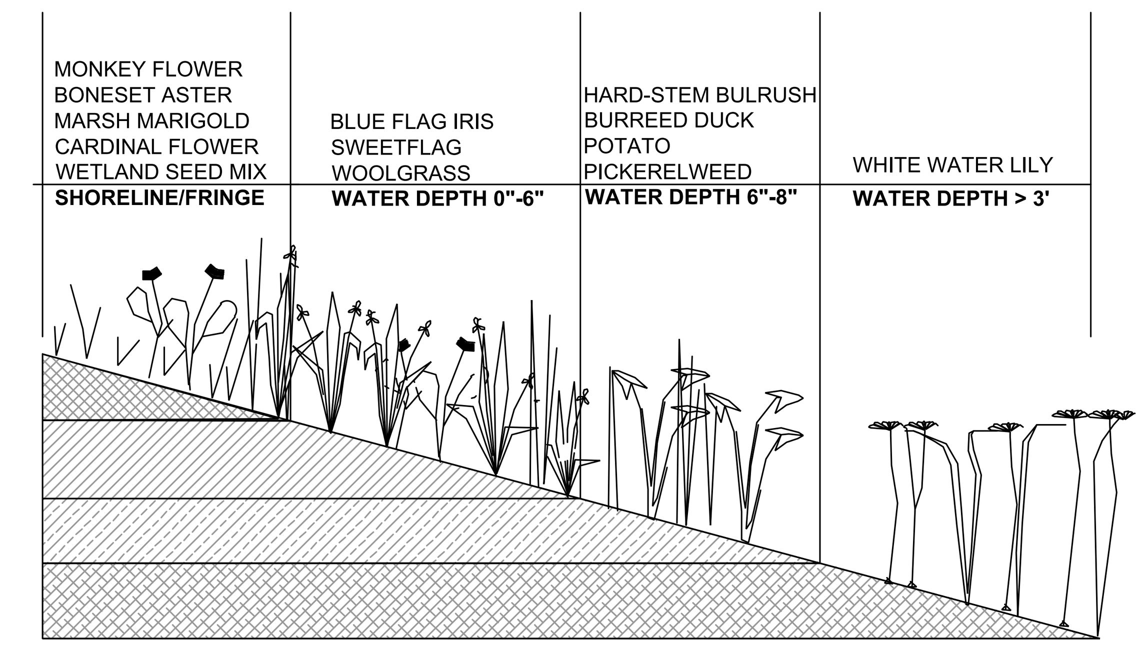
4 COIR LOG INSTALLATION (TYP.)

Scale: NTS



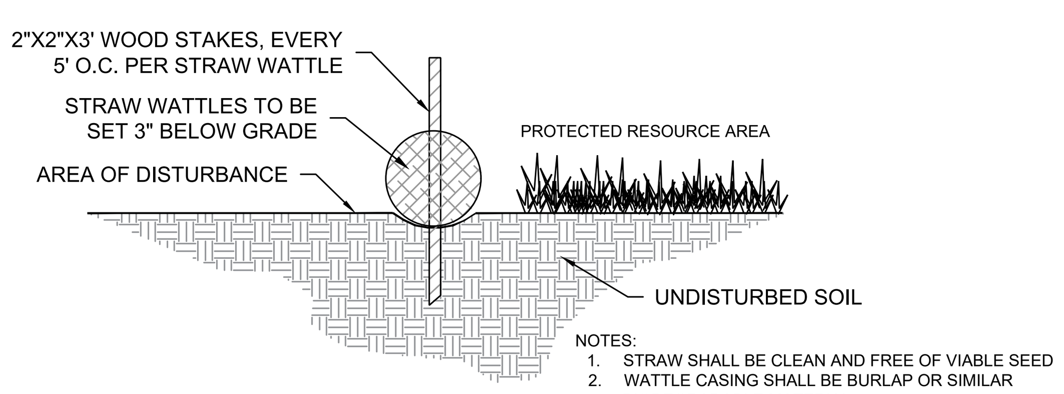
5 EMERGENT SHELF (TYP.)

Scale: NTS



6 EMERGENT SHELF PLANTING ZONES (TYP.)

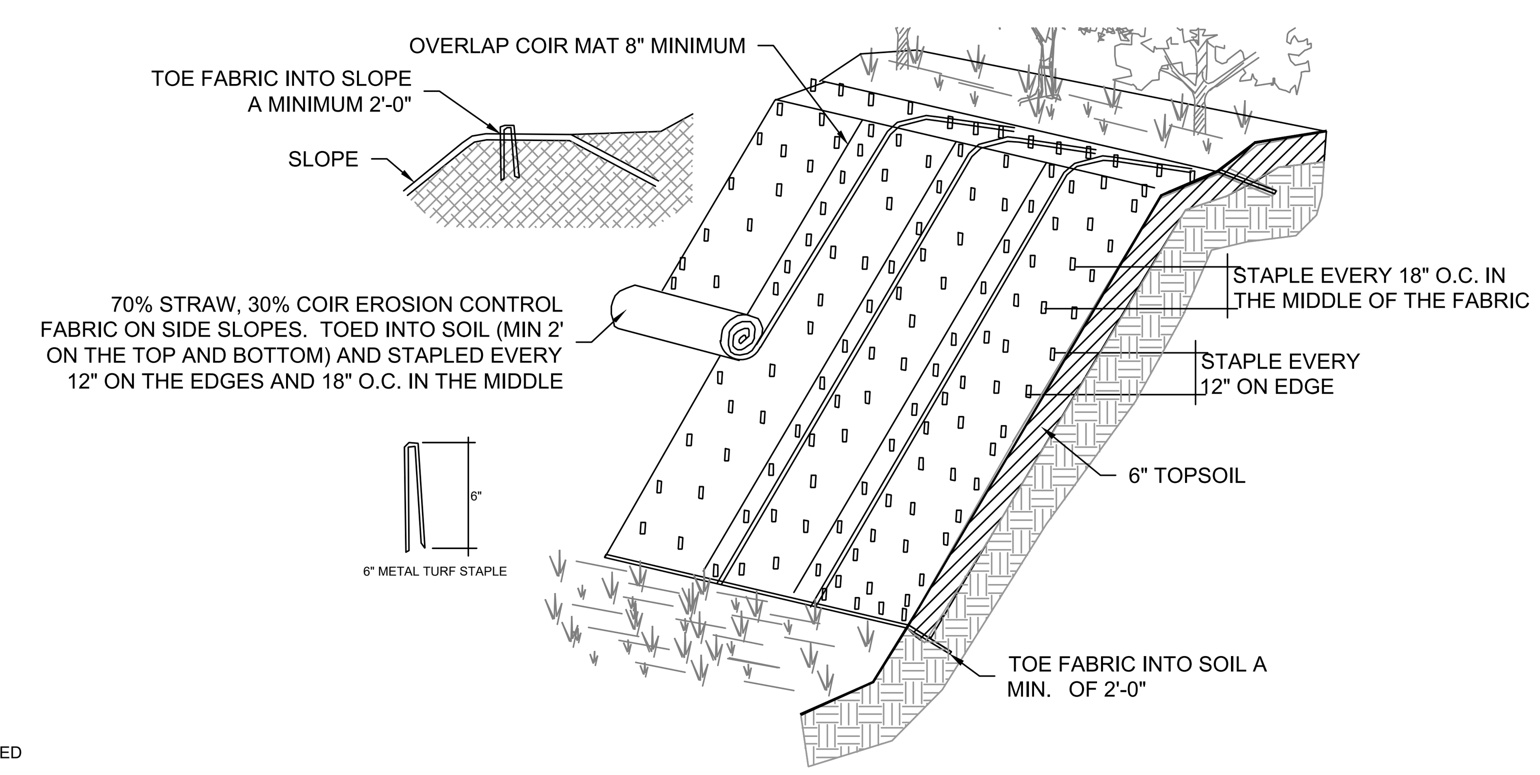
Scale: NTS



NOTES:
1. STRAW SHALL BE CLEAN AND FREE OF VIABLE SEED
2. WATTLE CASING SHALL BE BURLAP OR SIMILAR BIODEGRADABLE MATERIAL

7 STRAW WATTLE EROSION CONTROL

Scale: NTS



8 BIODEGRADABLE EROSION CONTROL FABRIC SLOPE STABILIZATION DETAIL

Scale: NTS

EROSION CONTROL FABRIC NOTES:
1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS TO ENSURE THAT THE EROSION CONTROL FABRIC WILL HAVE GOOD SOIL CONTACT.
2. APPLY PERMANENT SEEDING BEFORE PLACING EROSION CONTROL FABRIC.
3. LAY FABRIC LOOSELY AND STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.
4. STAPLE FABRIC WITH 6" STAPLES. STAPLE FABRIC EVERY 12" ON SIDES, TOP AND BOTTOM. 18" O.C. IN THE MIDDLE OF THE FABRIC. (PER MANUFACTURES SPECIFICATIONS)
5. THE EROSION CONTROL FABRIC TO BE INSTALLED IN SECTIONS RUNNING FROM THE TOP TO THE BOTTOM OF THE SLOPE, ALONG THE ENTIRE AREAS AS SHOWN ON THE PLAN (PER MANUFACTURES SPECIFICATIONS)
6. EROSION CONTROL FABRIC SHALL USE BIODEGRADABLE (NON-PLASTIC) NETTING
7. TO BE USED ONLY IN AREAS OF TEMPORARY SOIL DISTURBANCE ON SLOPES ADJACENT TO THE POND.
8. FLAT SURFACES SHALL RECEIVE STRAW MULCH APPLIED TO THE GROUND SURFACE AT A RATE OF 2,500 LBS./ACRE.

ARLINGTON RESERVOIR - PHASE 2

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BANK RESTORATION DETAILS

4.0

EROSION CONTROL PLAN AND CONSTRUCTION SEQUENCING

EROSION AND SEDIMENT CONTROL METHODS FOR THE PROJECT INCLUDE STRUCTURAL AND STABILIZATION PRACTICES. STRUCTURAL PRACTICES INVOLVE THE CONSTRUCTION OF DEVICES TO DIVERT AND LIMIT RUNOFF. STABILIZATION PRACTICES WILL BE IMPLEMENTED TO COVER EXPOSED SOIL SO THAT DISCHARGE OF SEDIMENT IS MINIMIZED. AN ADEQUATE STOCKPILE OF EROSION CONTROL MATERIALS WILL BE MAINTAINED AT THE PROJECT SITE IN THE EVENT OF AN EMERGENCY OR ROUTINE REPAIR.

TO FURTHER MINIMIZE SEDIMENT LOSS ON THE SITE, A GENERAL CONSTRUCTION SEQUENCE PLAN HAS BEEN DEVELOPED. THE FOLLOWING ARE PROCEDURES TO BE FOLLOWED:

1. ALL VEHICLES AND EQUIPMENT BROUGHT TO THE PROJECT SITE SHALL BE CLEAN AND FREE OF INVASIVE PLANT MATERIAL.
2. THE WETLAND SPECIALIST SHALL MARK OUT RESOURCE BOUNDARIES IN IMPACT/RESTORATION AREAS IN THE FIELD PRIOR TO CONSTRUCTION.
3. PRIOR TO ANY SITE GRADING OR SITE WORK, THE CONTRACTOR SHALL INSTALL ALL SEDIMENT AND EROSION CONTROLS AS SHOWN ON THE RESTORATION PLAN, PLUS ANY ADDITIONAL CONTROLS REQUESTED BY THE WETLAND SPECIALIST BASED ON SITE CONDITIONS TO PREVENT SEDIMENT FROM LEAVING THE SITE OR FURTHER ENCROACHING INTO WETLANDS AND THE RESERVOIR.
4. THE CONTRACTOR FOREMAN SHALL BE DESIGNATED AS THE ON-SITE INDIVIDUAL RESPONSIBLE FOR THE DAILY MONITORING AND MAINTENANCE OF ALL SEDIMENT AND EROSION CONTROLS. ANY BREACH OR FAILURE IN SEDIMENT CONTROLS SHALL BE IMMEDIATELY REPAIRED OR REPLACED. SEDIMENT BUILD-UP BEHIND ANY EROSION CONTROL BARRIER SHALL BE REMOVED WHENEVER SEDIMENT HAS ACCUMULATED TO 3-INCHES IN DEPTH.
5. THE CONTRACTOR SHALL INCORPORATE PERMANENT EROSION CONTROL FEATURES, PERMANENT SLOPE STABILIZATION, AND VEGETATION INTO THE PROJECT PLANS AT THE EARLIEST PRACTICAL TIME TO MINIMIZE THE NEED FOR TEMPORARY CONTROLS.
6. ANY AREA DISTURBED WITHIN THE LIMIT OF BANK WORK IS TO BE SEEDED WITH NEW ENGLAND SEMI-SHADE GRASS AND FORBS SEED MIX UNLESS SPECIFIED OTHERWISE IN THE PLANTING PLAN. THE GROUND SURFACE SHALL BE SCARIFIED PRIOR TO SEEDING. AFTER SEEDING, STRAW MULCH SHALL BE APPLIED TO THE GROUND SURFACE AT A RATE OF 2,500 LBS./ACRE. SEEDED AND/OR PLANTED SLOPES GREATER THAN 3:1 SHALL BE COVERED WITH A BIODEGRADABLE EROSION CONTROL BLANKET SPECIFIED IN THE PLANS.
7. THE CONTRACTOR SHALL MAINTAIN TEMPORARY EROSION AND SEDIMENTATION CONTROL SYSTEMS IN GOOD CONDITION UNTIL THE SITE IS STABLE, AS VERIFIED BY THE WETLAND SPECIALIST. ONCE THE SITE IS STABLE, THE SEDIMENT AND EROSION CONTROLS MAY BE REMOVED UNDER THE DIRECTION OF THE WETLAND SPECIALIST.
8. SHOULD ANY EROSION CONTROL BLANKET BE UTILIZED, THEY SHALL BE COMPRISED OF NON-SYNTHETIC MATERIALS (E.G., JUTE MATTING). NO EROSION CONTROL BLANKETS COMPOSED OF PLASTIC-BASED MATERIALS SHALL BE USED.

BANK RESTORATION NOTES

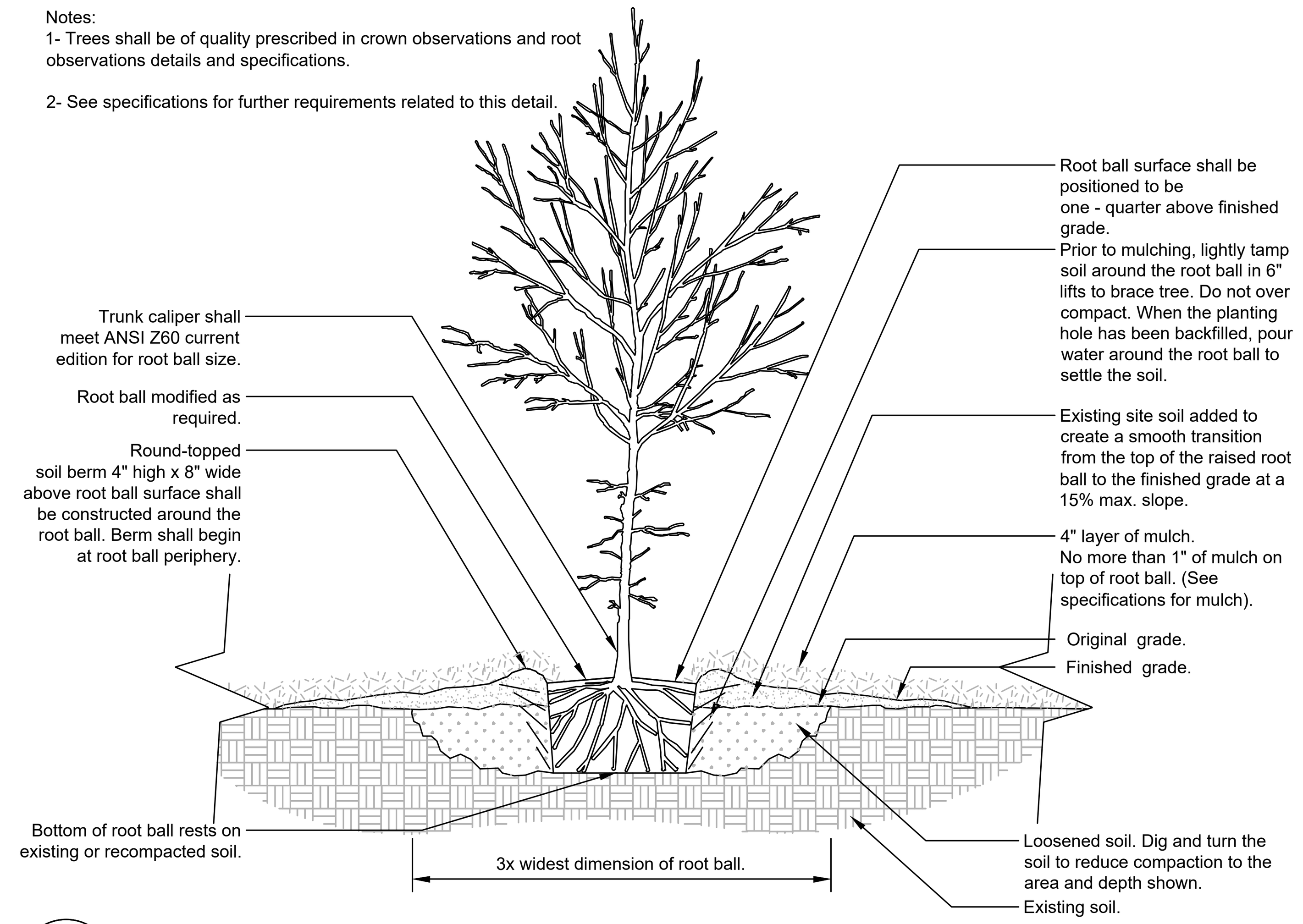
9. THE PURPOSE OF THIS RESTORATION PLAN IS TO IMPROVE BANK STABILITY OF ARLINGTON RESERVOIR BY REDUCING AND CONTROLLING SEDIMENTATION, RESTORING ERODED BANKS, AND ERADICATING NUISANCE VEGETATION.
10. THIS RESTORATION PLAN INCLUDES THREE ACTION OPTIONS DEPENDING ON THE EXTENT OF EXISTING EROSION CONDITIONS OBSERVED IN THE FIELD. BANK RESTORATION OPTIONS ADDRESS ONE OF THREE CONDITIONS A) VERTICAL BANK EROSION GREATER THAN 12 INCHES IN HEIGHT FROM THE WATER LINE, B) VERTICAL BANK EROSION LESS THAN 12 INCHES IN HEIGHT FROM THE WATER LINE, AND C) STABLE BANK EDGES WITH SLOPES DENUDED OF VEGETATION. AREAS INDICATED AS D) WERE OBSERVED TO BE STABLE AND SUFFICIENTLY VEGETATED AND REQUIRE NO ACTION.
11. ERODED PORTIONS OF POND EDGES ARE TO BE RESTORED WITH 12" BIODEGRADABLE COIR LOGS. COIR LOGS WILL BE INSTALLED BY HAND AND ASSOCIATED MINOR EARTHWORK WILL ALSO BE COMPLETED BY HAND OR WITH LIGHT MACHINERY. AREA OF RESERVOIR EDGES IMMEDIATELY UPGRADIENT OF COIR LOGS TO BE REVEGETATED AS NEEDED.
12. INVASIVE RIPARIAN AND AQUATIC WEEDS AND NUISANCE VEGETATION ARE TO BE REMOVED. REMOVAL TO BE CONDUCTED BY "HYDRO-RAKE" AND CHEMICAL TREATMENTS.
13. A FRIABLE "PLANTING BED" CONSISTENCY SHALL BE PREPARED. ANY COMPACTION CAUSED BY EXCAVATION SHALL BE ALLEVIATED.
14. THE RESTORATION AREAS ARE TO BE PLANTED WITH NATIVE WOODY SPECIES, THEN SEEDED WITH NATIVE SEED. (SEE PLANT LIST). PLANT SUBSTITUTIONS DUE TO COMMERCIAL AVAILABILITY OR HYDROLOGIC CONDITIONS MUST BE APPROVED BY THE WETLAND SPECIALIST.
15. THE EROSION CONTROL BARRIER BETWEEN THE RESERVOIR AND RESTORATION AREAS SHALL BE REMOVED UPON STABILIZATION OF THE RESTORATION AREAS AND THE AREA RAKED TO ELIMINATE ANY BERM THAT MAY BE PRESENT BETWEEN THE RESOURCE RESTORATION AREAS AND THE ADJACENT BVW OR RESERVOIR. ANY BARE SOIL THAT RESULTS FROM THE REMOVAL OF THE EROSION CONTROLS SHALL BE SEEDED WITH THE SPECIFIED SEED MIX. ALL STAKES AND TWINE SHALL BE REMOVED.

SEEDING GUIDANCE

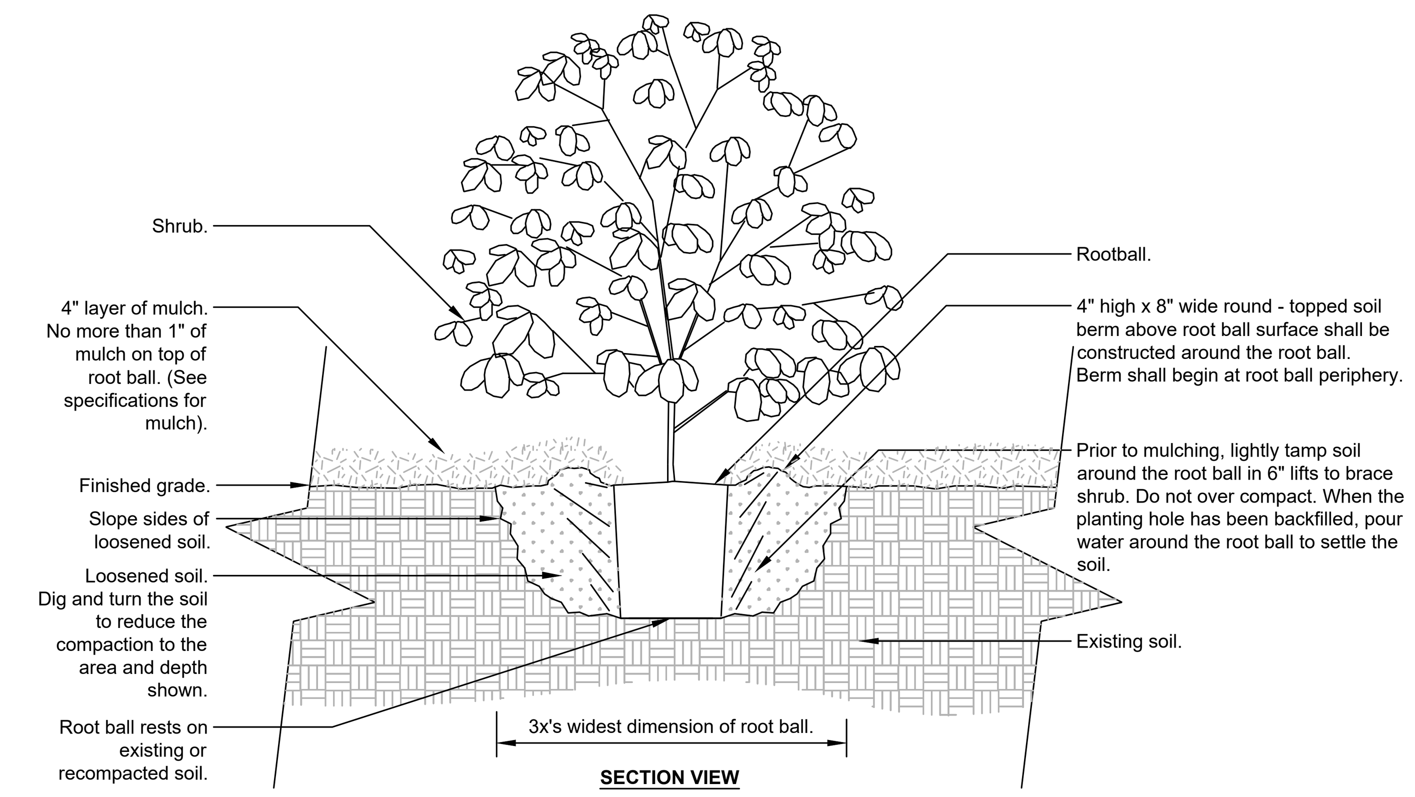
16. SEED METHODOLOGY: THE FOLLOWING METHODOLOGY PROVIDES SEQUENCING FOR ESTABLISHING THE SEED MIXES PRESCRIBED ON IN THE PLANS. THIS PROCESS SHOULD BEGIN FOLLOWING FINAL GRADING. THIS METHODOLOGY DOES NOT SPECIFY A TEMPORARY COVER CROP. A COVER CROP MAY BE NEEDED TO STABILIZE THE SITE DEPENDING ON WEATHER CONDITIONS AND CONSTRUCTION TIMING RELATIVE TO THE SEASONS AND THE IDEAL TIME FRAME FOR ESTABLISHING THE SEEDED AREAS. THE BEST TIME TO SEED FOR THIS PROJECT IS IN THE SPRING WHEN THE SOILS ARE AT A NORMAL MOISTURE CONTENT LEVEL (MOIST, NOT SATURATED) AND NO LATER THAN JUNE 30. WEATHER FORECASTS SHOULD BE MONITORED AS OCCASIONAL WATERING MAY BE NECESSARY IF A DRY SPRING SEASON OCCURS. THE SEEDING SEQUENCE SHOULD BEGIN NO LONGER THAN 48 HOURS AFTER FINAL GRADING. SITE STABILIZATION TECHNIQUES SHOULD BE UTILIZED IN THIS 48-HOUR TIME PERIOD.
17. SOIL SCARIFICATION/ SEED BED PREPARATION: SEED BED PREPARATION IS THE PROCESS OF SCARIFYING AND LOOSENING THE SOIL SURFACE TO CREATE A LOOSE, FRIABLE, SOIL SURFACE. THE SOIL SURFACE SHOULD BE A UNIFORM PLANAR SURFACE THAT IS FLAT AND WITHOUT EXCESSIVE RIDGES, FURROWS, RUTS OR MOUNDS AND LOW SPOTS WHERE WATER CAN COLLECT. SOIL SCARIFICATION SHOULD ONLY OCCUR WHEN WEATHER, SOIL CONDITIONS, AND CONSTRUCTION PHASING ALLOWS FOR NO LONGER THAN 48 HOURS BETWEEN SCARIFICATION (THE BEGINNING OF THE SEEDING PROCESS) AND COVERING THE SEED WITH WEED FREE STRAW MULCH (NOT HAY), OR EROSION CONTROL BLANKET. THE SOIL SHOULD BE SCARIFIED TO MAXIMUM DEPTH OF 3 INCHES (SEE BELOW). DURING THIS PROCESS, AREAS WHERE COARSE GRAVEL DOMINATES THE SOIL SURFACE SHOULD BE IDENTIFIED AND AMENDED WITH FINE SANDY-SOIL COMMON BORROW GENERATED FROM ON-SITE EARTHWORK. THE IMPORTATION OF TOPSOIL SHOULD BE A LAST RESORT AND ONLY USED AS AN AMENDMENT FOR "LOCALIZED" SPOTS THAT LACK THE CHARACTERISTICS OF A SOIL SEED BED.
18. SEED APPLICATION: A WELL-PREPARED SEED BED PROVIDES A LOOSE FRIABLE SOIL SURFACE FOR WHICH THE SEED CAN BE SOWN INTO. SEED APPLICATION IS A TWO-PART PROCESS: 1) SEED APPLICATION AT PROPER RATES PER ACRE AND 2) SOW THE SEED INTO THE SOIL ¼ TO ½" DEPTH MAXIMUM. APPROPRIATE SEED RATES FOR EACH PRESCRIBED SEED MIX ARE SPECIFIED ON THE ACCOMPANYING DETAILS SHEET.
    a. SEEDING BY HAND: CHECK THE SEED LABEL PRIOR TO OPENING THE BULK BAG TO CONFIRM THE CORRECT SEED IS BEING APPLIED TO THE SPECIFIED LOCATION. THE BULK BAGS OF SEED SHOULD BE AGITATED BY HAND ON SITE TO REDISTRIBUTE THE SEEDS IN THE MATRIX BEFORE SPREADING. IN BARE AREAS A WEED FREE STRAW MULCH MAY BE USED TO COVER THE SOIL SURFACE FOLLOWING THE SEED APPLICATION.
    b. SOWING THE SEED: ONCE THE SEED IS SPREAD THE SEED MUST BE SOWN INTO THE SOIL TO THE DEPTH ABOVE TO INCREASE CHANCES OF GERMINATION BY KEEPING SOIL MOISTURE CLOSE TO THE SEED. THE SEED CAN BE SOWN BY A NUMBER OF WAYS INCLUDING "TRACKED" IN WITH A LOW PSI RUBBER TIRE OR TRACKED MACHINE, USING A YORK LANDSCAPE RAKE OR SIMILAR, OR THE TRADITIONAL MEANS OF USING A METAL LEAF RAKE.
19. RESEEDING: AREAS TO BE RESEEDED SHALL FOLLOW THE SAME SEEDING SEQUENCE OUTLINED ABOVE. IT IS EXPECTED THAT SAME SEEDED AREAS MAY NOT GERMINATE, BUT THAT OVER TIME THE PLANTED AREAS SHALL FILL IN THROUGH SEED PROLIFERATION AND GROWTH HABITS. AREAS LARGE ENOUGH TO BE IDENTIFIED THROUGH MONITORING AS BEING DOMINATED BY WEEDS OR OTHER INVASIVE SPECIES THAT HAVE OUT COMPETED THE SPECIFIED SEED MIX OR AREAS DEEMED UNSTABLE DUE TO LOW PLANT GROWTH SHALL BE RESEEDED ACCORDINGLY.
20. PLANT SUCCESSION NOTES: IT IS POSSIBLE THAT OVER TIME SOME SEEDED AREAS MIGHT BECOME DOMINATED BY NATIVE PLANT SPECIES EXISTING IN THE SOIL SEED BANK. ONE EXAMPLE OF THIS IS THE LIKELIHOOD THAT VARIOUS TYPES OF NATIVE FERNS COULD EMERGE IN SHADED AREAS. NO SPECIES OF FERNS ARE IN THE PRESCRIBED SEED MIX BUT ARE HIGHLY DESIRABLE SPECIES THAT CAN EXIST AND THRIVE IN THE IDENTIFIED PLANTING AREAS ADDING TO LANDSCAPE DIVERSITY. NATIVE SPECIES SUCH AS FERNS THAT EMERGE DUE TO BEING IN THE SOIL SEED BANK SHOULD REMAIN. THOROUGH AND REGULAR MONITORING DURING THE MATURATION OF THE ESTABLISHMENT AREAS IS A KEY COMPONENT TO BALANCING AREAS TO BE RESEEDED AND AREAS WHERE SUCCESSIONAL PLANT GROWTH OF NATIVES SHOULD BE ALLOWED TO THRIVE.

Notes:
1- Trees shall be of quality prescribed in crown observations and root observations details and specifications.

2- See specifications for further requirements related to this detail.



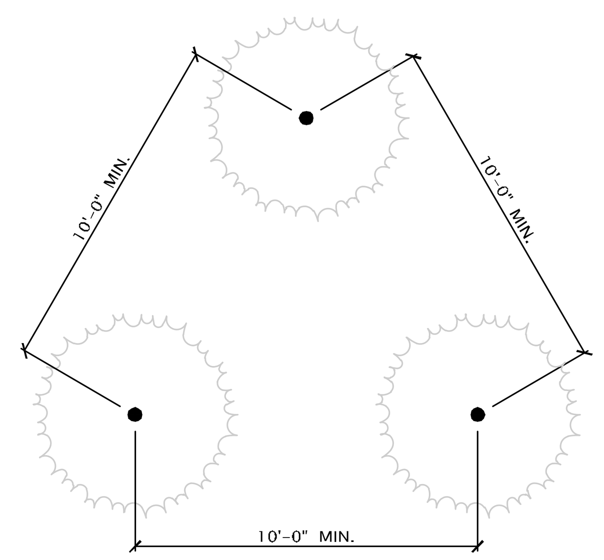
1 TREE PLANTING DETAIL
Scale: NTS



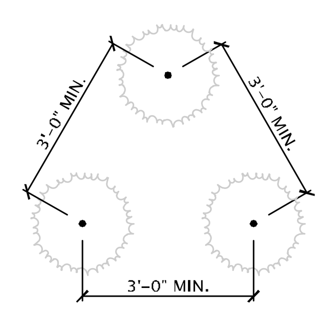
Notes:
1- Shrubs shall be of quality prescribed in the root observations detail and specifications.

2- See specifications for further requirements related to this detail.

2 SHRUB PLANTING DETAIL
Scale: NTS



3 TREE SPACING (TYP.)
Scale: NTS



4 SCRUB SPACING (TYP.)
Scale: NTS

New England Semi-Shade Grass and Forbs Mix

Botanical Name	Common Name	Indicator
Elymus virginicus	Virginia Wild Rye	FACW-
Elymus canadensis	Canada Wild Rye	FACU+
Festuca rubra	Red Fescue	FACU
Chamaecrista fasciculata	Partridge Pea	FACU
Liatris spicata	Spiked Gayfeather/Marsh Blazing Star	FAC+
Onoclea sensibilis	Sensitive Fern	FACW
Aster prenanthoides (Symphyotrichum prenanthoide)	Zigzag Aster	FAC
Eupatorium fistulosum (Eutrochium fistulosum)	Hollow-Stem Joe Pye Weed	FACW
Eupatorium perfoliatum	Boneset	FACW
Juncus tenuis	Path Rush	FAC

Apply: 30 lbs/acre

5 NEW ENGLAND SEMI-SHADE GRASS AND FORBS MIX
Scale: NTS Source: Seed mixes referenced herein are provided by New England Wetland Plants, Inc.

PLANT RESTORATION SCHEDULE

Cover Type	Abbrev.	Scientific Name	Common Name	Plant Size @ Installation	Area 'A'	Area 'B'	Area 'C'	Area 'D'
			Total Enhancement Area (lf)		2,120	1,650	130	680
			Total Enhancement Area Approx. (sf)		31,800	24,750	1,950	10,200
Trees								
	Ar	*Acer rubrum*	Red Maple	4'-6' ht. min.	--	9	3	--
	Ba	*Betula alleghaniensis*	Yellow Birch	4'-6' ht. min.	--	9		--
	Bp	*Betula populifolia*	Grey Birch	4'-6' ht. min.	--	9		--
	Ns	*Nyssa sylvatica*	Black Gum	4'-6' ht. min.	--	9	3	--
	Pd	*Populus deltoides*	Cottonwood	4'-6' ht. min.	--	9		--
	Qr	*Quercus rubra*	Red Oak	4'-6' ht. min.	--	9	3	--
	Sd	*Salix discolor*	Pussywillow	4'-6' ht. min.	--	9	3	--
	Sn	*Salix nigra*	Black Willow	4'-6' ht. min.	--	9	3	--
Shrubs								
	Ca	*Clethra alnifolia*	Sweet Pepperbush	3'-4' ht. min.	50	27	6	--
	Cs	*Cornus sericea*	Red Osier Dogwood	3'-4' ht. min.	50	27	6	--
	Iv	*Ilex verticillata*	Winterberry	3'-4' ht. min.	50	27	6	--
	Vd	*Viburnum dentatum*	Northern Arrowwood	3'-4' ht. min.	50	27	6	--
Herbacious								
- Shoreline/Fringe	Cp	*Caltha palustris*	Marsh Marigold	2" plug	2,100	1,800	150	--
	Ep	*Eupatorium perfoliatum*	Boneset Aster	2" plug	2,100	1,800	150	--
	Mr	*Mimulus ringens*	Monkey Flower	2" plug	2,100	1,800	150	--
- Water Depth 0"-6"	Am	*Acorus americana*	Sweetflag	2" plug	2,100	1,800	150	--
	Lc	*Lobelia cardinalis*	Cardinal Flower	2" plug	2,100	1,800	150	--
	Iv	*Iris versicolor*	Blue Flag Iris	2" plug	2,100	1,800	150	--
- Water Depth 6"-8"	Pc	*Pontederia cordata*	Pickerelweed	2" plug	1,350	1,050	450	--
	Sa	*Schoenoplectus acutus*	Hard-stem Bulrush	2" plug	1,350	1,050	450	--
	Sc	*Scirpus cyperinus*	Woolgrass	2" plug	1,350	1,050	450	--
	Sl	*Sagittaria latifolia*	Duck Potato	2" plug	1,350	1,050	450	--
	Sm	*Sparganium americanum*	Burreed	2" plug	1,350	1,050	450	--
- Water Depth > 3'	No	*Nymphaea odorata*	White Water Lily	tuber		5,220	5,850	--
Seed Mix								
	New England Erosion Control/Restoration Mix For Detention Basins and Moist Sites (Lbs)			18lbs/acre	13.0	11.0	1.0	--

Tree quantities specified are based off the USDA New England Forest: Baseline for New England Forest Health Monitoring report.
Trees shall be installed not less than 10 feet on center and no farther than 12 feet on center.
Shrubs shall be planted in clusters of 2 or 3, and shall be installed not less than 3 feet on center.
Areas within planting areas not 100% vegetated with existing herbaceous plants will be seeded with the appropriate seed mix at the manufacturers specified rate to cover the bare area.
A wetland scientist or landscape architect shall provide supervision of the plant layout.
Plant substitutions may be necessary due to commercial availability. Substitutions shall be approved by the supervising wetland scientist or landscape architect.
Invasive species control semi-annually for the first two-years
Area A woody material assumes 50% slope coverage of upland areas based on the USDA New England Forest prescribed rate of 240 trees per acre and 75% shrub cover at the prescribed spacing above
Area B woody material assumes 50% slope coverage of upland areas based on the USDA New England Forest prescribed rate of 240 trees per acre and 75% shrub cover at the prescribed spacing above
Area C woody material assumes 25% slope coverage of upland areas based on the USDA New England Forest prescribed rate of 240 trees per acre and 75% shrub cover at the prescribed spacing above
Fringe and aquadic vegetation assumes an average of 3 square feet of planting area per linear foot at 12-inch on center spacing for each community

6 PLANT SCHEDULE
Scale: NTS

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

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Drawn By: TS Checked By: MM
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BANK RESTORATION DETAILS AND NOTES

5.0

WOODARD
&CURRAN

STORMWATER MANAGEMENT REPORT

Arlington Reservoir – Phase 2

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woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

0233115.00
Town of Arlington
Massachusetts
October 2020

TABLE OF CONTENTS

TABLES

APPENDICES

1. PROJECT DESCRIPTION

1.1 Introduction

On behalf of the Town of Arlington, Massachusetts (the Town), Woodard & Curran, Inc. (Woodard & Curran) has prepared this Stormwater Management Report for the proposed improvements to the Arlington Reservoir, located at 210 Lowell Street in Arlington, Massachusetts (the Site). The Town is proposing to revitalize the eastern shore of the Arlington Reservoir recreation area. Weston & Sampson Engineers, Inc. (Weston and Sampson), on behalf of the Town of Arlington, developed a Master Plan for the Reservoir in 2018. This proposed project encompasses Phase 2 of the Master Plan and improvements include installing porous pavement over the approximately 0.5-acre gravel parking area in the southern portion of the site, installation of new ADA-accessible pathways, a new play area, a multi-use court, a boat launch, and several other Site improvements as shown on the Post-Development Watershed Figure located in **Appendix C**. The impacts of these improvements to the Site's stormwater drainage patterns are summarized in this report.

1.2 Existing Conditions

A Site Locus Plan on a United States Geological Survey (USGS) Quadrangle Map depicting the project location has been provided in **Appendix A**. Arlington Reservoir is a 65-acre man-made recreational and stormwater-control pond on the Arlington and Lexington Town border. About half of the reservoir's open water is located in the Town of Lexington, however, the Town of Arlington owns and manages the reservoir. The earthen dam around the southern edge of the Reservoir is approximately 600 yards long and up to 14 feet tall. The water within the Reservoir discharges into Mill Brook through a sluice gate.

In 1935, the Town of Arlington constructed a sandy beach on the Reservoir's eastern shore. In the late 1970s, the Town completed improvements to the beach and added an embankment to separate the swimming area from the rest of the Reservoir. The beach now includes a filtered, chlorinated swimming area with a ramp for ADA accessibility, a bathhouse, vending machines, a concession area, and a playground. The Reservoir also has a one-mile walking trail around its perimeter, open to the public throughout the year.

1.2.1 Land Cover and Soils

Land cover and soils datasets were used to develop hydrologic curve numbers. Land cover was determined by a site visit conducted on September 3, 2020 and review of aerial photography and site survey data. A more detailed examination of the existing land cover within individual drainage subcatchments can be found in section 2.2.2. All existing impervious areas located within the Town of Lexington that are proposed to be replaced with a pervious land cover are required to be considered open space in good condition for stormwater calculations purposes per Lexington's Stormwater Management Regulations.

Soil characteristics were observed during test pit evaluations conducted in August 2020 and supplemented with information obtained from the United States Department of Agriculture's (USDA's) most recent Web Soil Survey. A Site map showing soil types and hydrologic soil group classifications within the project vicinity from the USDA's Web Soil Survey is located in **Appendix B**.

Test pits were conducted by Civil Design Consultants, Inc. (CDCI) of Methuen, Massachusetts on August 6, 2020 to evaluate the subsurface soil conditions and identify the estimated seasonal high groundwater table elevation. In all four borings conducted, CDCI observed a surface layer of fill ranging from 9 to 27 inches in depth, followed by a sandy loam layer extending to the bottom of each test pit. From these test pits, it was determined that at its highest elevation in the 0.5-acre parking lot, the seasonal high groundwater table is located approximately at elevation 159.40. Woodard & Curran used this data to locate the proposed stormwater best management practices (BMPs) at elevations with at

least two feet of separation from groundwater. Bedrock was not encountered during test pitting activities. The test pit logs and location figure provided by CDCI are located in **Appendix B**.

1.2.2 Topography

Subcatchment boundaries were delineated using the site survey performed and prepared by Weston & Sampson in December 2017. Topographically, the eastern shore of the Reservoir generally slopes downward from Lowell Street towards the Reservoir, with the exception of the southern-most portion of the 0.5-acre gravel parking area, which slopes downwards towards a ditch just north of the property located at 202 Lowell Street.

In both the pre- and post-development Site conditions, stormwater travels across the Site via overland flow and discharges into one of three Design Points: Arlington Reservoir, the on-Site swimming area, and the ditch located north of 202 Lowell Street. The Design Points and contributing areas are further described in Section 2.2.1. and are depicted in the Pre- and Post-Development Watershed Figures in **Appendix C**.

1.2.3 Resource and Critical Areas

Woodard & Curran reviewed Massachusetts Geographic Information System (MassGIS) data, the Massachusetts Department of Environmental Protection's (MassDEP's) Habitat of Potential Regional and Statewide Importance maps, the Massachusetts Stormwater Handbook, the Massachusetts Year 2016 Integrated List of Waters, and the Federal Emergency Management Agency's (FEMA's) National Flood Hazard Layer (NFHL) database. The findings of our review are below:

- The Massachusetts Endangered Species Act (MESA) protects rare species and their habitats by prohibiting the taking of any plant or animal species listed as Endangered, Threatened, or Special Concern by the Massachusetts Division of Fisheries & Wildlife. MESA review is required by the Natural Heritage & Endangered Species Program (NHESP) for projects and activities located within a Priority or Estimated Habitat of Rare Species. Review of the MassGIS Data shows there are no Priority or Estimated Habitats within the Project Area; therefore, the project is not subject to MESA review.
- Per MassGIS Data, there are no Certified or Potential Vernal Pools within or near the project area.
- Per MassGIS Data, the project is not located within any Areas of Critical Environmental Concern.
- Per the MassDEP's Habitat of Potential Regional and Statewide Importance maps for the Towns of Arlington and Lexington, the project in not located within a Habitat of Regional or Statewide Importance.
- Per the Massachusetts Stormwater Handbook, critical areas include Outstanding Resource Waters and Special Resource Waters, recharge areas for public water supplies, bathing beaches, cold-water fisheries, and shellfish growing areas. Review of MassGIS Data indicated that the Arlington Reservoir is not located within a resource area, however, the Swimming Area on the eastern shore of the Reservoir is classified as a bathing beach, as defined in 105 CMR 445, and thus a critical area.
- Per the Massachusetts Year 2016 Integrated List of Waters, Mill Brook, which receives discharges from Arlington Reservoir via a sluice gate on the southern portion of the Reservoir, is classified as a Category 5 water, meaning the waterbody requires a Total Maximum Daily Load (TMDL) restriction. Mill Brook's impairment of concern is Escherichia Coli (E. Coli). Proposed site improvements are not likely to increase E. Coli levels in Arlington Reservoir, and thus contributing to Mill Brook's impairment.

- Per FEMA's NFHL database, the majority of the Site is located within an area of minimal flood hazard (Zone X). The Reservoir's shoreline and the isolated swimming area are located within special flood hazard areas (Zone AE). The FEMA NFHL FIRMette Map is located in **Appendix A**.

Measures taken to address the presence of a critical area on-Site are detailed in Section 3.6. Critical areas have specific stormwater analysis guidelines, requiring the use of certain pollution prevention measures and BMPs to the maximum extent practicable for redevelopment projects.

1.3 Proposed Project Work

The proposed project consists of paving the approximately 0.5-acre gravel parking area in the southern portion of the site, renovation of the existing bathhouse and concessions building, installation of new ADA-accessible concrete pathways, lifeguard stands, picnic tables, a playground, multi-use court, boat launch, check-in shelter, and several other surficial Site improvements. Construction activities are expected to begin in March 2021 and end in November 2021.

2. STORMWATER EVALUATION

2.1 Stormwater Modeling Methodology

TR-55/TR-20 methodology was used to develop a hydrologic model of the site. Woodard & Curran used the computer program entitled HydroCAD Version 10.0, developed by HydroCAD Software Solutions, LLC in order to create and analyze the site hydrology. The analysis was conducted in order to establish the peak rates of runoff and estimated runoff volume from the project site. This was accomplished to evaluate pre- and post-development conditions during various storm events. Contributing drainage areas were identified and soils, surface cover, watershed slope, and flow paths were evaluated to develop the necessary HydroCAD model input parameters. A minimum Time of Concentration (Tc) of 6 minutes was used in the calculations, as applicable.

Drainage calculations were performed for the pre- and post-development conditions for the 1-, 2-, 10-, 25-, and 100-year 24-hour Type III storm events, and are included in **Appendix D**, in accordance with the Town of Arlington's, Town of Lexington's, and the Massachusetts Department of Environmental Protection's Stormwater Management Regulations. The total rainfall for each of the storm events was based upon data published by the Northeast Regional Climate Center (NRCC) and Natural Resources Conservation Service (NRCS) entitled *Extreme Precipitation in New York and New England* found at http://precip.eas.cornell.edu/. The total precipitation depth for the project site associated with each rainfall event is outlined in **Table 2-1**, below.

Table 2-1: Design Rainfall Data

Type III 24-Hour Storm Event (Frequency)	Rainfall Depth (Inches)
1-Year	2.67
2-Year	3.21
10-Year	4.86
25-Year	6.17
100-Year	8.85

A copy of the NRCC and NRCS Extreme Precipitation Table for the project Site is included in **Appendix A**.

2.2 Hydraulic Model Description

A stormwater model has been developed to compare the peak runoff rates from the pre-development site to the peak runoff rates anticipated from the post-development site. As further described herein, the model demonstrates that the post-development runoff rates will not exceed pre-development rates.

2.2.1 Design Points

Existing and proposed subcatchments were delineated in order to compare pre- and post-development peak rates of runoff. Although the size of each subcatchment differs slightly between the existing and proposed site conditions, the total area analyzed between the two conditions remained the same. A Design Point was established for each watershed, symbolizing the area's ultimate stormwater discharge location. For this analysis, two watershed areas were identified, and therefore two Design Points were chosen, as follows:

- Design Point 1 (DP-1): represents runoff discharging to the Arlington Reservoir and Swimming Area.

- Design Point 2 (DP-2): represents runoff discharging to the ditch located north of the property at 202 Lowell Street.

The locations of the Design Points do not differ in the pre- and post-development analyses, as seen in the figures located in **Appendix C**.

2.2.2 Pre-Development Conditions

The pre-development project area consists of a swimming area, sandy beach, bathhouse, vending machines, concession area, playground, pump station building, walking paths, benches, lifeguard stands, a 0.5-acre gravel parking lot, a small paved parking lot, and various other Site features. Existing grassed areas on-Site were modeled to be in “fair” condition, as much of the grassed surfaces are currently covered in beach sand and therefore are not likely infiltrating groundwater as efficiently as grass in “good” condition would be.

Per Article 15 – Storm Water Mitigation of the Town of Arlington’s Title V – Regulations Upon the Use of Private Property Bylaws, impervious surfaces are defined as “a hard-surfaced, human-made area that does not readily absorb or retain water, preventing the infiltration of storm water runoff; including but not limited to…parking and driveway areas…” Upon review of existing conditions at the site, it appears the 0.5-acre gravel parking lot on the southern half of the Site exhibits the hydrologic characteristics one would expect with an impervious surface. Ponded water has been observed on the gravel surface several days after rain events due to its inability to infiltrate to the soil below. Based on this review and Article 15 of the Town of Arlington’s Title V Bylaws, the gravel parking area has been considered impervious for the purposes of this stormwater analysis.

The pre-development watershed area is approximately 5.42 acres in size. There are no existing stormwater BMPs on-Site; stormwater runoff from the three subcatchments within the project area is conveyed via overland flow to their respective design points, as described below:

- *Subcatchment 1:* Subcatchment 1 encompasses the northern portion of the Site, including the playground, beach, and parking lots. Stormwater runoff from subcatchment 1 flows via overland flow from east to west before discharging into the Arlington Reservoir and Swimming Area (DP-1), which is classified by MassDEP as a critical area. The area is approximately 5.22 acres in size; land cover is primarily comprised of grass, beach sand, surface water, and impervious gravel with smaller areas of brush, impervious structures, and sand pathways. The calculated weighted curve number for this subcatchment is 71.

- *Subcatchment 2:* Subcatchment 2 encompasses the southern-most portion of the 0.5-acre gravel parking area. Stormwater runoff from subcatchment 3 flows via overland flow from north to south before discharging into the ditch just north of the property at 202 Lowell Street (DP-2). The area is approximately 0.20 acre in size; land cover is primarily comprised of impervious gravel, grass, and brush, with smaller areas of impervious surfaces. The calculated weighted curve number for this subcatchment is 64.

The subcatchment areas and their associated design points are illustrated on the Pre-Development Watershed Figure provided in **Appendix C** of this Report.

2.2.3 Post-Development Conditions

The post-development project area will consist of a swimming area, sandy beach, renovated bathhouse, vending machine, and concession area, a newly-paved picnic pavilion and drop-off area, a new check-in area, permeable multi-surface athletic court, playground, lifeguard stands, walking paths, restored grass areas, 21,500 square-foot porous pavement parking lot, and various other Site features. The new walking paths around the project area will be ADA-

accessible and will allow increased Site access not currently provided in the Site's existing condition. The porous pavement parking lot is described in further detail in Section 2.2.4.

Similar to the pre-development model, the post-development watershed area is also 5.42 acres in size. Stormwater runoff from the two subcatchments will flow to its respective design points, as described below:

- *Subcatchment 1:* Subcatchment 1 will encompass the northern portion of the Site, including the playground, beach, and parking lots. Stormwater runoff from subcatchment 1 will flow via overland flow from east to west before either discharging directly into Arlington Reservoir and Swimming Area (DP-1) or into the porous pavement system proposed for installation over the Site's southern parking area. Stormwater entering the porous pavement system will either infiltrate into the ground or, during large storm events, will be collected by the system's underdrain and discharged towards Arlington Reservoir. The subcatchment area will be approximately 5.32 acres in size; land cover will be primarily comprised of grass, surface water, beach sand, porous asphalt pavement, and various impervious surfaces (including standard asphalt pavement, concrete walkways, and structures), with smaller areas of brush, permeable playground and athletic court surfaces, and stone dust. The calculated weighted curve number for this subcatchment is 69.

- *Subcatchment 2:* Subcatchment 2 will encompass the area south of the porous pavement parking area. Stormwater runoff from subcatchment 2 will flow via overland flow from north to south before discharging into the ditch just north of the property at 202 Lowell Street (DP-2). The area will be approximately 0.10 acre in size; land cover will be entirely comprised of grass. The calculated weighted curve number for this subcatchment is 39.

The subcatchment areas and their associated design points are illustrated on the Post-Development Watershed Figure provided in **Appendix D** of this Report.

2.2.4 Low Impact Development Technique – Porous Pavement

Porous pavement was selected as a Low Impact Development (LID) technique for this Site in accordance with the Arlington Reservoir Master Plan written by Weston & Sampson in 2018. The proposed 21,500 square-foot porous pavement parking lot will replace the existing impervious gravel lot, which will provide a stabilized parking area and minimize the amount of maintenance required to upkeep the parking lot and reduce the amount sediment transported into Arlington Reservoir during post-construction conditions. Stormwater directed to the porous pavement will filter through the system's asphalt, choker, and pea gravel courses and enter the reservoir course, designed to provide storage capacity while stormwater infiltrates into the soils beneath the system. The bottom of the reservoir course was designed at elevation 161.40, providing a 2-foot separation from the highest seasonal high groundwater table elevation observed during test pitting activities conducted at the Site. A four-inch PVC underdrain and three grate inlets will be installed within the western-most portion of the system's reservoir course to provide an outlet for stormwater during extreme storm events. The invert of these outlets was designed at the 100-year storm elevation within the porous pavement BMP, meaning rainfall greater than the 100-year storm will flow through the reservoir course of the pavement system to the PVC underdrain and grate inlets and will discharge to the Arlington Reservoir (DP-1).

Volume 1, Chapter 1 of the Massachusetts Stormwater Handbook does not list porous pavement as an approved stormwater BMP for discharges near bathing beaches and Volume 2, Chapter 2 of the Handbook states that porous pavement shall be set back at least 100 feet from surface waters to receive any water quality credit. Existing Site constraints, including the lack of available area to install stormwater BMPs and the proximity to surface water across the entire project area, inhibit the use of many typical BMPs. Although porous pavement is not a listed BMP for bathing beaches, its use can be implemented within the project area and it will improve stormwater treatment at the Site by increasing water quality volume, annual recharge, and removal of total suspended solids (TSS) in the post-development Site condition.

2.3 Peak Discharge Rates and Runoff Volumes

The tables below summarize the pre- and post-development peak discharge rates and runoff volumes for each Design Point.

Table 2-2: Pre- and Post-Development Peak Discharge Rates

Design Point	1-year (cfs)			2-year (cfs)			10-year (cfs)			25-year (cfs)			100-year (cfs)		
	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ
DP-1	2.96	1.65	**-1.31**	4.93	3.15	**-1.78**	12.11	8.92	**-3.19**	18.53	14.29	**-4.24**	32.53	26.30	**-6.23**
DP-2	0.04	0.00	**-0.04**	0.10	0.00	**-0.10**	0.33	0.00	**-0.33**	0.54	0.02	**-0.52**	1.04	0.13	**-0.91**

Note: Δ stands for net difference between the pre- and post-development rates.

Table 2-3: Pre- and Post-Development Runoff Volumes

Design Point	1-year (af)			2-year (af)			10-year (af)			25-year (af)			100-year (af)		
	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ
DP-1	0.25	0.17	**-0.08**	0.38	0.27	**-0.11**	0.87	0.66	**-0.21**	1.32	1.03	**-0.29**	2.32	1.87	**-0.45**
DP-2	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.03	0.00	**-0.03**	0.04	0.00	**-0.04**	0.07	0.01	**-0.06**

Note: Δ stands for net difference between the pre- and post-development volumes.

Table 2-2 demonstrates a decrease in peak discharge rates between the existing and proposed site conditions for all scenarios shown above; **Table 2-3** demonstrates a decrease in runoff volumes between the existing and proposed site conditions for all scenarios shown above. Complete copies of the pre- and post-development HydroCAD computer model outputs demonstrating that peak discharge rates and runoff volumes decrease between the existing and proposed Site conditions are included in **Appendix D**.

3. COMPLIANCE WITH STORMWATER MANAGEMENT STANDARDS

Volume 1, Chapter 1 of the Massachusetts Stormwater Handbook states:

> *"For purposes of the Stormwater Management Standards, redevelopment projects are defined to include…maintenance and improvement of existing roadways, including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving."*

By this definition, the Arlington Reservoir Phase 2 project is considered a redevelopment project, meaning certain Standards included in the Massachusetts Stormwater Handbook only need to be met to the maximum extent practicable (as defined by Standard 7). The following sections further detail applicability of these Stormwater Management Standards and demonstrates that the proposed Arlington Reservoir – Phase 2 Project complies with these requirements.

3.1 Standard 1: No New Untreated Discharges

"No new stormwater conveyances (e.g. outfalls) will discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth."

In the existing site condition, stormwater is generally transported via overland flow towards the Arlington Reservoir and Swimming Area (DP-1) and the ditch just north of the property at 202 Lowell Street (DP-2). Runoff from the project area is not currently treated prior to discharge. The proposed site improvements will not create any new untreated stormwater discharges and will result in a net decrease in impervious area of approximately 18,000 square feet. Stormwater runoff from Site will be either conveyed via overland flow to Design Points, similar to existing condition drainage patterns, or will be treated by a new porous pavement system prior to infiltrating into the ground or, during extreme storms greater than the 100-year event, discharging into the Arlington Reservoir (DP-1) after filter treatment. There are no proposed untreated stormwater discharges that will cause erosion in or to wetlands or waters of the Commonwealth. This Standard has been met.

3.2 Standard 2: Peak Rate Attenuation

"Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates."

Calculations are provided to show that the post-development peak discharge rates do not exceed pre-development rates for the 1-, 2-, 10-, 25-, and 100-year 24-hour storm events. A detailed description of both the existing and proposed Site conditions are located in Section 2.2 of this report. Copies of the existing and proposed HydroCAD computer model outputs demonstrating that this standard has been met are included in **Appendix D**.

3.3 Standard 3: Recharge

"Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This condition is met when the stormwater management system is designed to infiltrate the required volume as determined in accordance with the Massachusetts Stormwater Handbook."

The proposed improvements will decrease the amount of impervious area across the project Site by approximately 18,000 square feet. No additional groundwater recharge volume is required, however, installation of porous pavement over the existing gravel parking lot in the southern portion of the Site and restoration of grass areas throughout the Site

are proposed as part of this project. The porous pavement and restored grass areas will increase stormwater infiltration, and therefore annual recharge, in the post-development Site condition.

3.4 Standard 4: Water Quality

"Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when: (a) Suitable practices for source control and pollution prevention are identified in long-term pollution prevention plan, and thereafter implemented and maintained; (b) Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and (c) Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook."

Existing Site conditions provide 0% TSS removal. The Town of Arlington is proposing to install a porous pavement system over the existing gravel parking lot in the southern portion of the Site. The system will increase water quality volume and remove TSS from the stormwater runoff produced from the proposed parking lot area and the adjacent grass area to the east sloping downward from Lowell Street in the post-development Site condition. During storm events, stormwater will filter through the porous pavement system's asphalt, choker, and pea gravel courses and enter the reservoir course, designed to provide storage capacity while stormwater infiltrates into the soils beneath the system.

According to Volume 2, Chapter 2 of the Massachusetts Stormwater Handbook, porous pavement systems can remove up to 80% of TSS if the reservoir course is designed to hold the Site's required water quality volume and to drain within 72 hours of a storm event. The proposed Site improvements will decrease the amount of impervious area across the project Site by approximately 18,000 square feet, and therefore no additional water quality volume is required on-Site. However, the porous pavement system's reservoir course has been designed to store the 100-year storm event and to drain within 26 hours of the 100-year event. Therefore, it can be assumed that the proposed porous pavement system will remove up to 80% of the TSS in stormwater runoff discharging to the system. On other parts of the proposed project Site, this Standard is met to the maximum extent practicable by not creating any new untreated stormwater discharges.

An Operations and Maintenance Plan is provided in **Appendix E**, which specifies suitable practices for source control and long-term pollution prevention.

3.5 Standard 5: Land Uses with Higher Potential Pollutant Loads

"For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook."

The proposed project is not considered a Land Use with Higher Potential Pollutant Loads; therefore, this standard does not apply.

3.6 Standard 6: Critical Areas

"Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or to any other critical area require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas as provided in the Massachusetts Stormwater Handbook."

Per the Massachusetts Stormwater Handbook, the Arlington Reservoir and associated Swimming Area on the eastern shore of the Reservoir are classified as critical areas. These surface water features are described throughout this report as DP-1 and will receive stormwater discharges from subcatchment 1 in the post-development Site condition. Critical areas have specific stormwater analysis guidelines, requiring the use of certain pollution prevention measures and BMPs to the maximum extent practicable for redevelopment projects. Compliance with these guidelines is discussed below:

- Standard 6 requires BMP trains discharging to critical areas to remove 80% of TSS prior to discharge. There are no existing stormwater BMPs located in subcatchment 1. In the proposed Site condition, the majority of stormwater runoff from subcatchment 1 will travel, via overland flow, to the Reservoir and Swimming Area by passing over grassed areas and beach sand prior to discharging into DP-1. This stormwater runoff will not be treated by a stormwater BMP, similar to existing Site conditions. Stormwater runoff produced from the proposed porous parking lot area and the adjacent grass area to the east sloping downward from Lowell Street will filter through the porous pavement system, during which 80% of TSS will be removed.

- A water quality depth of one-inch (1") must be used for water quality volume calculations in critical areas. The proposed Site improvements will decrease the amount of impervious area across the project Site by approximately 18,000 square feet, and therefore no additional water quality volume is required on-Site.

The proposed Site improvements meet this Standard to the maximum extent practicable.

3.7 Standard 7: Redevelopment

"A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5 and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions."

The proposed project is considered a redevelopment project and will decrease the overall impervious area on Site by approximately 18,000 square feet. The proposed work fully complies with Stormwater Management Standards 1, 2, 3, 5, 8, 9, and 10, and complies, to the maximum extent practicable, with Standards 4 and 6 as described herein.

3.8 Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

"A plan to control construction related impacts including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented."

A plan to control construction-related impacts, specifically erosion and sedimentation, has been developed and is included in **Appendix F**. The proposed project has been designed to minimize land disturbance and preserve existing vegetation to the maximum extent practicable. The proposed construction BMPs have been designed in accordance with Massachusetts Erosion and Sediment Control BMPs Handbook published by MassDEP.

The Contractor will be responsible for implementing the specified erosion and sedimentation control methods. These measures will be maintained and kept in place until the disturbed areas of the project have fully stabilized. In addition, a U.S. Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Construction General Permit is required whenever construction activities will disturb one or more acres; the proposed project will disturb approximately 5.42 acres.

3.9 Standard 9: Operation and Maintenance Plan

"A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed."

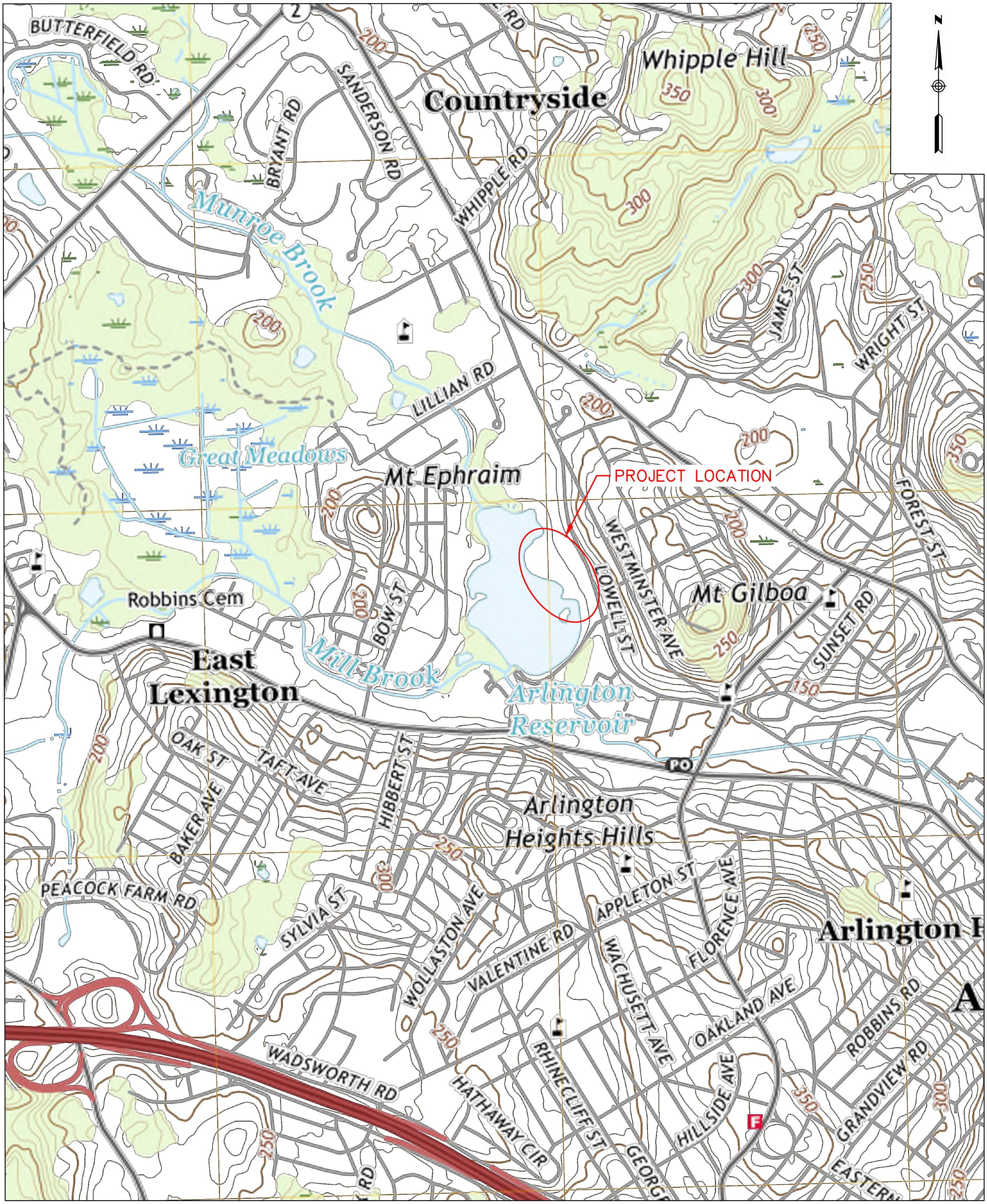
A long-term Operation and Maintenance Plan is included in **Appendix E** of this report.

3.10 Standard 10: Prohibition of Illicit Discharges

Standard 10 states that "All illicit discharges to the stormwater management system are prohibited."

The project will not result in any new illicit discharges. An Illicit Discharge Compliance Statement will be submitted prior to construction.

APPENDIX A: ENVIRONMENTAL RESOURCE DOCUMENTATION



NOTES:

1. BASE MAP TAKEN FROM UNITED STATES GEOLOGICAL SERVICES, DATED 2018. ACCESSED ON SEPTEMBER 15, 2020.

WOODARD & CURRAN
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Andover, Massachusetts 01810
866.702.6371 | www.woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

ARLINGTON RESERVOIR PHASE 2
LOCUS MAP

DESIGNED BY: LLT	CHECKED BY: BSM
DRAWN BY: LLT	2020.09.15 LOCUS MAP.dwg

TOWN OF ARLINGTON, MA
51 GROVE STREET
ARLINGTON, MA 02476

ARLINGTON RESERVOIR
210 LOWELL ST, ARLINGTON, MA

JOB NO: 0233115.00
DATE: SEPTEMBER 2020
SCALE: N.T.S.

FIGURE 1

\\woodardcurran.net\shared\Projects\0233115.00 KZLA Architects - Arlington Reservoir Phase 2\wip\Drawings\Figures\2020.09.15 Locus Map.dwg, Sep 15, 2020 - 3:00pm LTOBEY

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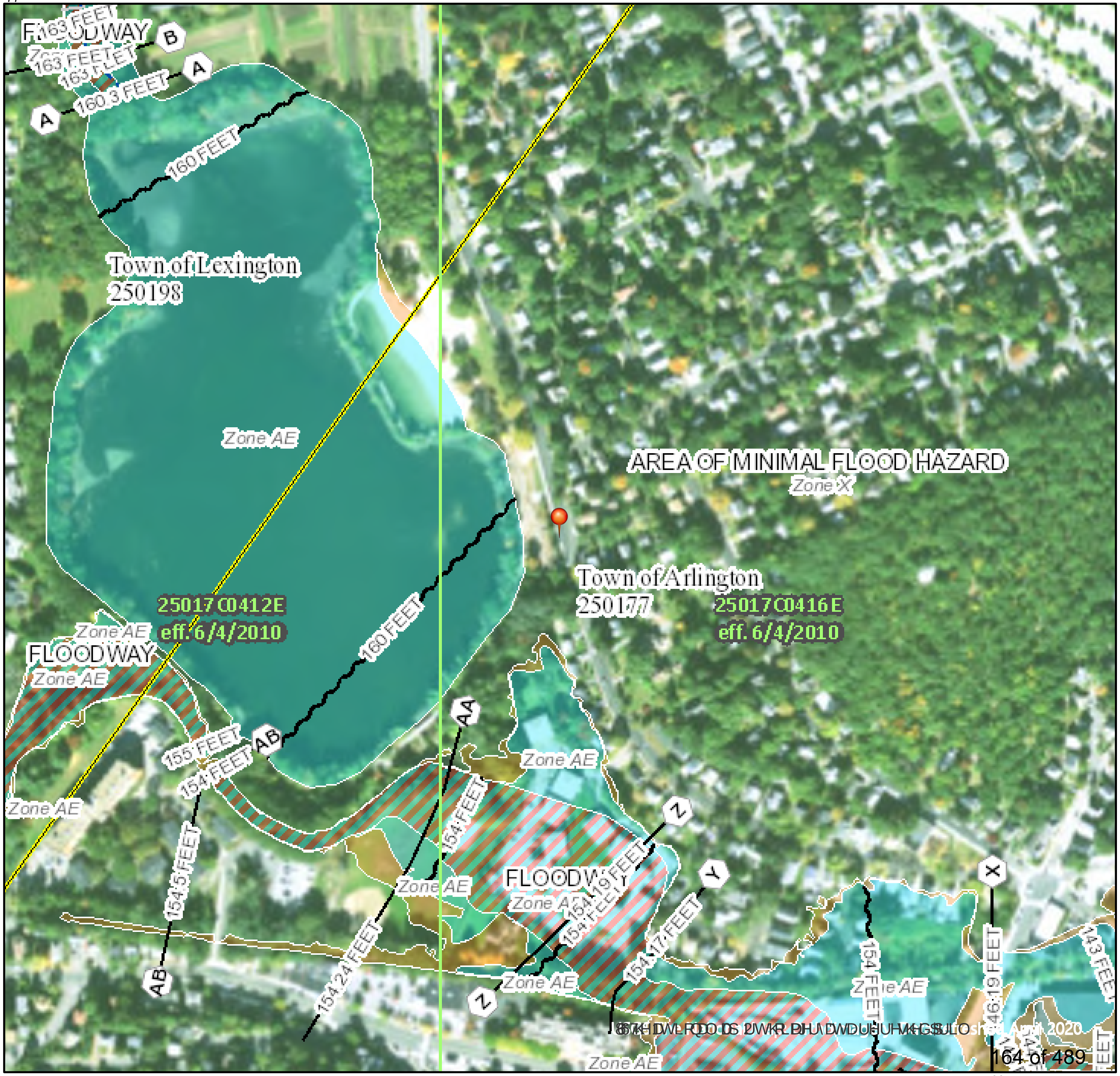
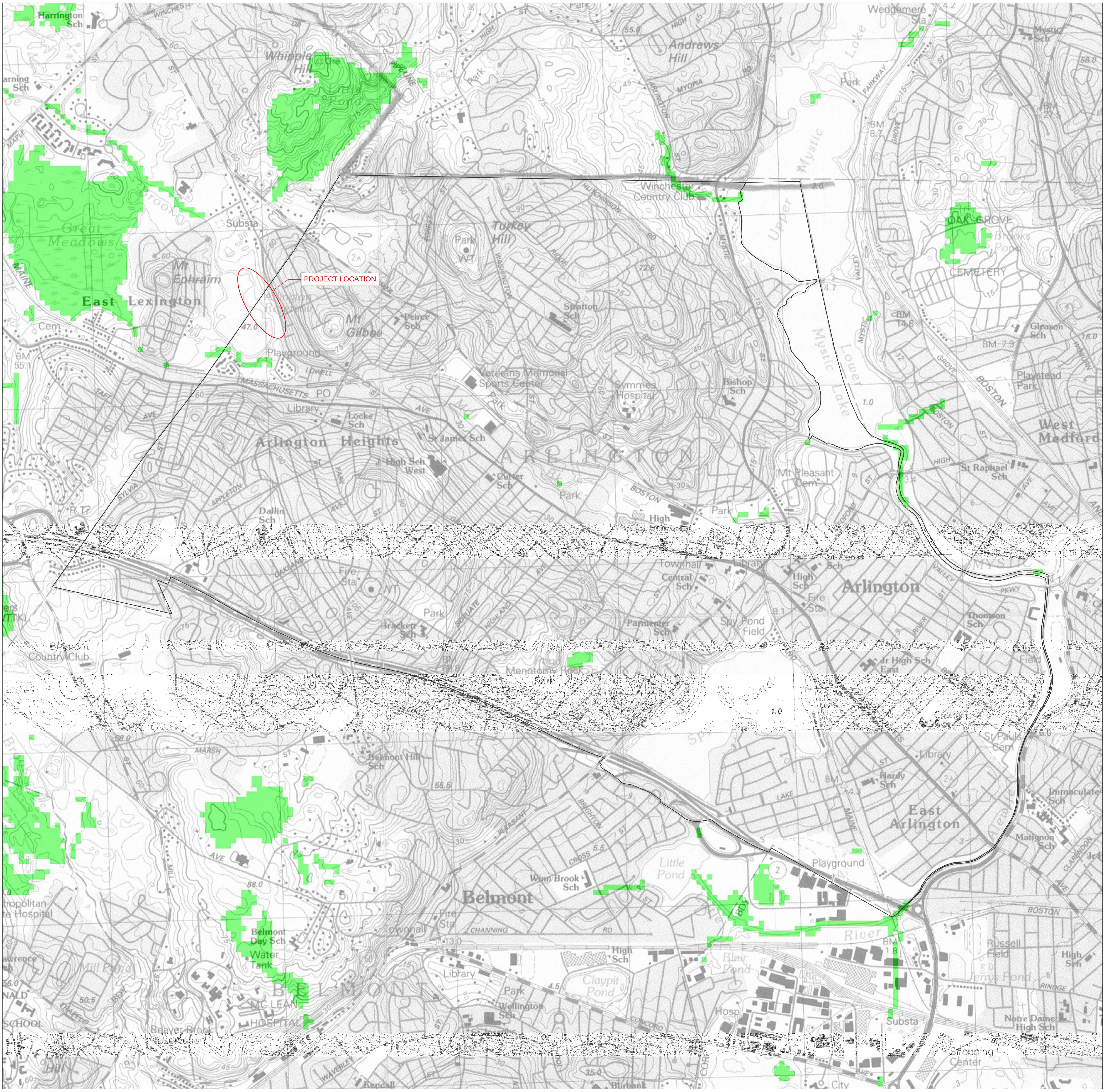
FEMA



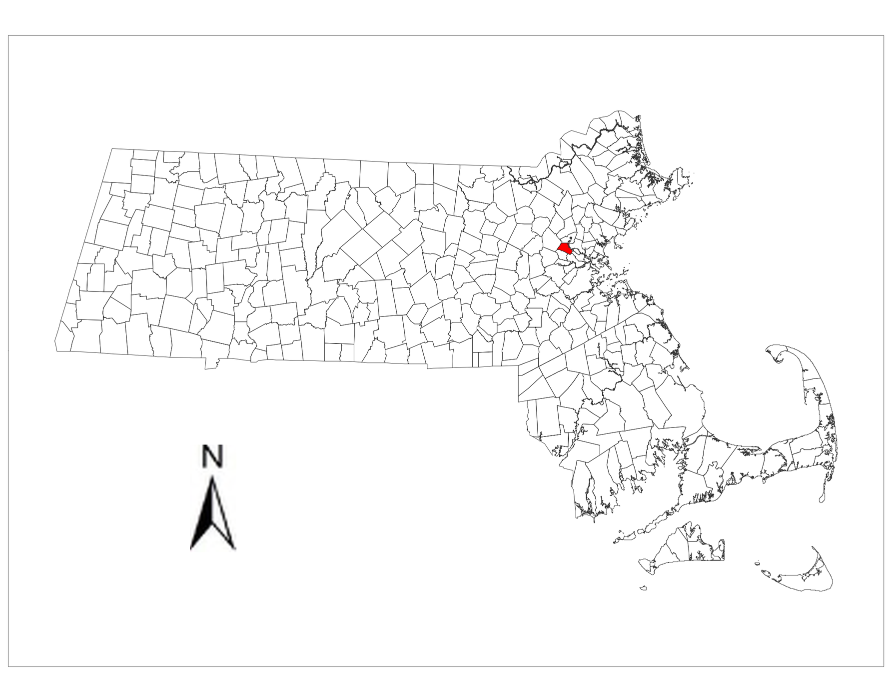
Habitat of Potential Regional or Statewide Importance
Town of ARLINGTON, MA



0 | 0.5 | 1 | 2 Miles

Important Wildlife Habitat

Updated November 2011



The MassDEP's Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands, June 2006 adopted a new approach for assessing wildlife habitat impacts associated with work in wetlands. This approach utilizes maps developed at the University of Massachusetts Amherst using the Conservation Assessment and Prioritization System (CAPS). The maps depict "Habitat of Potential Regional or Statewide Importance" that may trigger more intensive levels of review. For more information on how to assess wildlife habitat impacts, see Section III of the Guidance document: http://www.mass.gov/dep/water/laws/wldhab.pdf.

The CAPS model assesses the ecological integrity of Massachusetts landscape features as influenced by environmental stressor metrics (e.g. pollution, fragmentation). CAPS relies on data that are broadly available across Massachusetts. Ecological features which are not consistently surveyed or uniformly available, such as certified vernal pools, rare species, and contamination sites are not included in CAPS. When available, this more specific ecological information may be used in conjunction with the CAPS outputs to better understand particular sites in Massachusetts and support informed conservation decision-making. For more information on the statewide maps produced by the CAPS model, see: http://www.masscaps.org.

These maps are funded in part by the Massachusetts Executive Office of Energy and Environmental Affairs, the Massachusetts Department of Environmental Protection and the U.S. Environmental Protection Agency under section 104 (b)(3) of the U.S. Clean Water Act. Environmental data sources include the Office of Geographic and Environmental Information (MassGIS).

MassDEP

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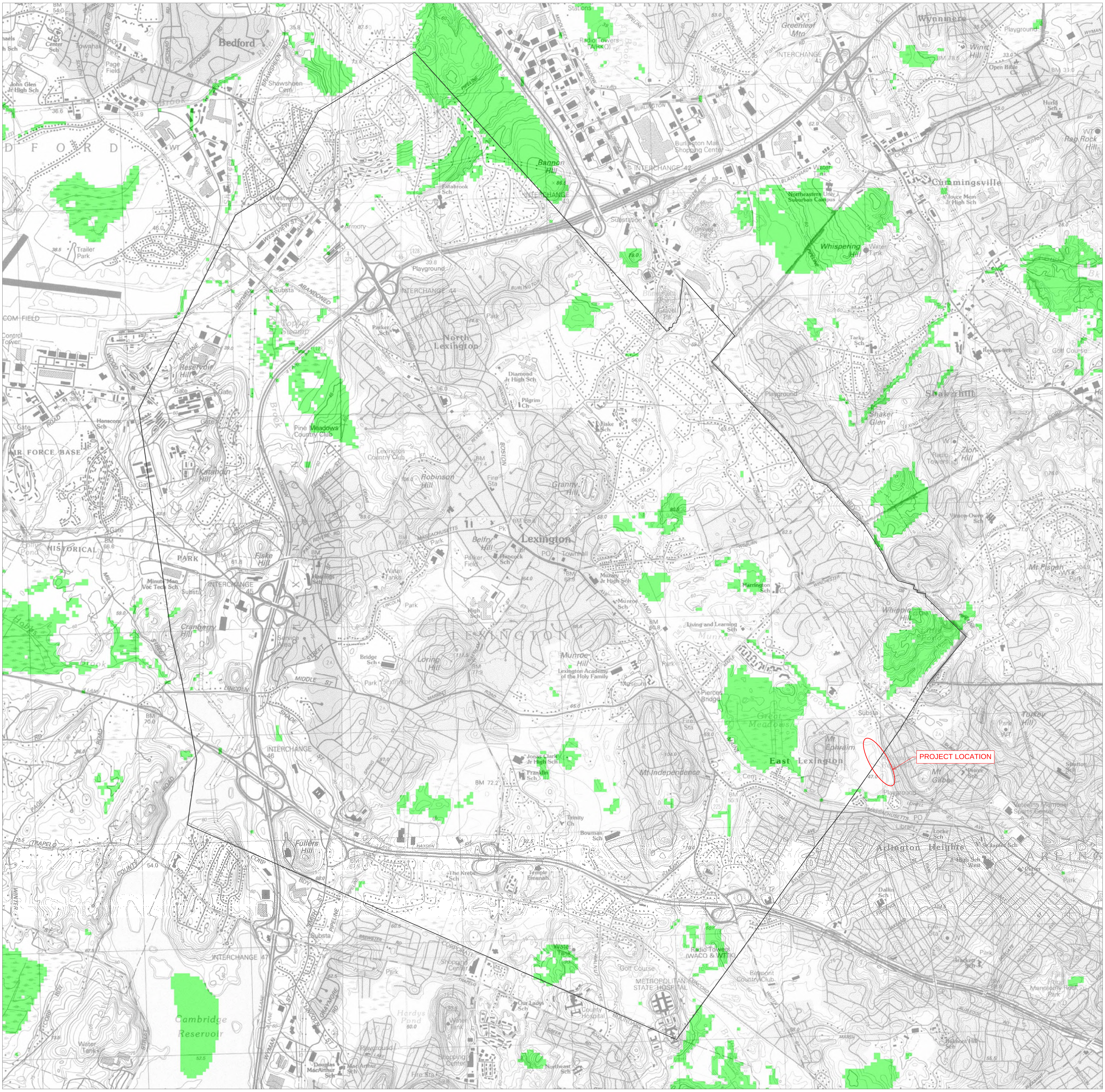
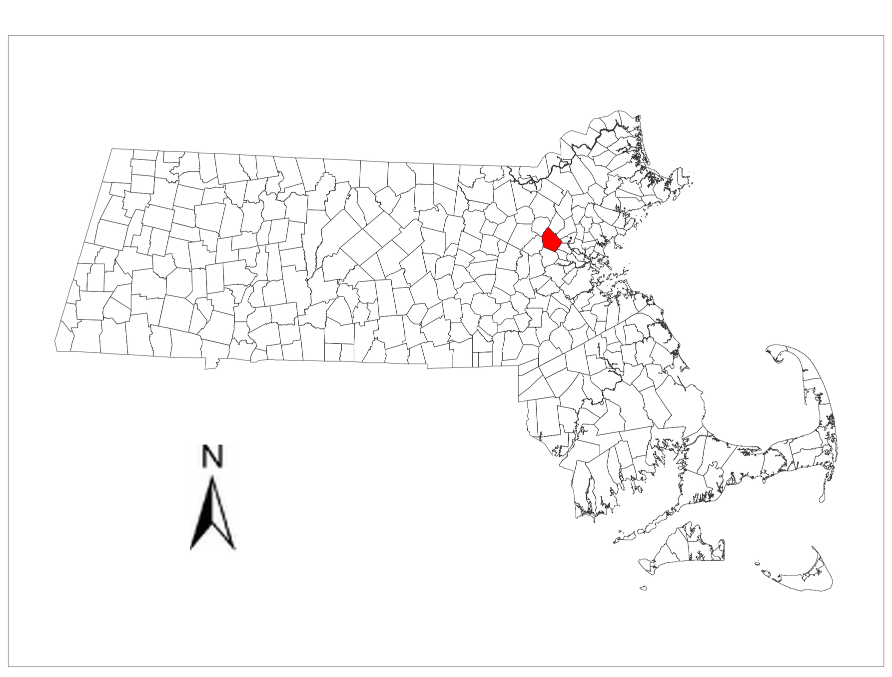
Habitat of Potential Regional or Statewide Importance
Town of LEXINGTON, MA



0 | 0.5 | 1 | 2 Miles

Important Wildlife Habitat

Updated November 2011



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MassDEP

UMass Extension
CENTER FOR AGRICULTURE

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	Massachusetts
Location	
Longitude	71.187 degrees West
Latitude	42.428 degrees North
Elevation	0 feet
Date/Time	Thu, 10 Sep 2020 11:23:56 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.70	0.87	1.10	**1yr**	0.75	1.04	1.28	1.63	2.08	2.67	2.90	**1yr**	2.36	2.79	3.26	3.95	4.62	**1yr**
2yr	0.35	0.53	0.67	0.88	1.10	1.39	**2yr**	0.95	1.28	1.61	2.03	2.55	3.21	3.56	**2yr**	2.84	3.42	3.92	4.66	5.31	**2yr**
5yr	0.41	0.64	0.81	1.08	1.38	1.76	**5yr**	1.19	1.60	2.05	2.58	3.24	4.07	4.53	**5yr**	3.60	4.35	4.97	5.93	6.65	**5yr**
10yr	0.47	0.73	0.93	1.26	1.64	2.10	**10yr**	1.41	1.90	2.45	3.10	3.89	4.86	5.43	**10yr**	4.31	5.22	5.95	7.11	7.88	**10yr**
25yr	0.56	0.88	1.12	1.55	2.05	2.66	**25yr**	1.77	2.39	3.11	3.94	4.95	6.17	6.92	**25yr**	5.46	6.66	7.55	9.05	9.87	**25yr**
50yr	0.62	1.00	1.29	1.81	2.43	3.19	**50yr**	2.10	2.84	3.75	4.75	5.95	7.39	8.32	**50yr**	6.54	8.00	9.04	10.87	11.71	**50yr**
100yr	0.72	1.17	1.50	2.13	2.89	3.81	**100yr**	2.50	3.37	4.48	5.69	7.13	8.85	10.00	**100yr**	7.83	9.62	10.84	13.05	13.90	**100yr**
200yr	0.82	1.34	1.74	2.49	3.44	4.56	**200yr**	2.97	4.01	5.38	6.84	8.57	10.61	12.04	**200yr**	9.39	11.57	12.99	15.68	16.50	**200yr**
500yr	1.00	1.64	2.13	3.09	4.33	5.78	**500yr**	3.74	5.05	6.85	8.72	10.91	13.49	15.38	**500yr**	11.94	14.79	16.51	20.00	20.71	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.37	0.46	0.62	0.76	0.84	**1yr**	0.65	0.82	1.14	1.43	1.76	2.39	2.46	**1yr**	2.12	2.37	2.89	3.50	4.01	**1yr**
2yr	0.33	0.51	0.63	0.85	1.05	1.25	**2yr**	0.90	1.23	1.44	1.90	2.46	3.10	3.43	**2yr**	2.74	3.30	3.78	4.49	5.14	**2yr**
5yr	0.39	0.60	0.74	1.02	1.29	1.50	**5yr**	1.12	1.46	1.72	2.23	2.87	3.73	4.13	**5yr**	3.30	3.97	4.54	5.42	6.11	**5yr**
10yr	0.43	0.66	0.82	1.15	1.48	1.71	**10yr**	1.28	1.67	1.93	2.51	3.22	4.29	4.76	**10yr**	3.80	4.58	5.22	6.21	6.96	**10yr**
25yr	0.50	0.76	0.94	1.34	1.77	2.03	**25yr**	1.53	1.98	2.28	2.95	3.75	5.14	5.73	**25yr**	4.55	5.51	6.26	7.40	8.25	**25yr**
50yr	0.55	0.84	1.04	1.50	2.02	2.32	**50yr**	1.74	2.27	2.57	3.33	4.22	5.89	6.57	**50yr**	5.21	6.32	7.18	8.42	9.37	**50yr**
100yr	0.61	0.93	1.16	1.68	2.30	2.64	**100yr**	1.99	2.58	2.91	3.58	4.74	6.77	7.54	**100yr**	5.99	7.25	8.24	9.55	10.65	**100yr**
200yr	0.69	1.04	1.31	1.90	2.65	3.01	**200yr**	2.29	2.94	3.30	4.00	5.35	7.76	8.65	**200yr**	6.87	8.32	9.45	10.81	12.08	**200yr**
500yr	0.80	1.19	1.54	2.23	3.17	3.58	**500yr**	2.74	3.50	3.88	4.63	6.27	9.30	10.35	**500yr**	8.23	9.95	11.33	12.69	14.28	**500yr**

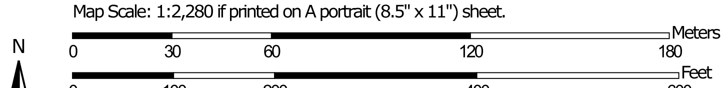
Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.31	0.48	0.59	0.79	0.97	1.13	**1yr**	0.84	1.11	1.32	1.76	2.24	2.86	3.14	**1yr**	2.53	3.02	3.50	4.29	5.02	**1yr**
2yr	0.36	0.56	0.69	0.93	1.15	1.35	**2yr**	0.99	1.32	1.56	2.06	2.66	3.34	3.71	**2yr**	2.96	3.57	4.09	4.86	5.52	**2yr**
5yr	0.45	0.69	0.86	1.18	1.50	1.78	**5yr**	1.30	1.74	2.04	2.63	3.35	4.43	4.98	**5yr**	3.92	4.79	5.42	6.45	7.20	**5yr**
10yr	0.54	0.84	1.04	1.45	1.87	2.19	**10yr**	1.62	2.14	2.54	3.19	4.02	5.51	6.24	**10yr**	4.88	6.00	6.73	8.03	8.82	**10yr**
25yr	0.71	1.07	1.34	1.91	2.51	2.88	**25yr**	2.17	2.82	3.36	4.11	5.11	7.32	8.42	**25yr**	6.48	8.09	8.97	10.76	11.55	**25yr**
50yr	0.85	1.30	1.62	2.33	3.13	3.56	**50yr**	2.70	3.48	4.16	4.99	6.13	9.11	10.57	**50yr**	8.06	10.16	11.13	13.44	14.18	**50yr**
100yr	1.04	1.58	1.98	2.85	3.92	4.39	**100yr**	3.38	4.29	5.16	6.33	7.35	11.32	13.28	**100yr**	10.02	12.77	13.82	16.82	17.43	**100yr**
200yr	1.27	1.91	2.42	3.51	4.89	5.41	**200yr**	4.22	5.29	6.41	7.73	8.81	14.10	16.70	**200yr**	12.48	16.06	17.18	21.05	21.44	**200yr**
500yr	1.65	2.46	3.17	4.60	6.54	7.13	**500yr**	5.64	6.97	8.53	10.08	11.21	18.85	22.64	**500yr**	16.68	21.77	22.89	28.39	28.21	**500yr**

APPENDIX B: SOILS MAP AND TEST PIT LOGS

Hydrologic Soil Group—Middlesex County, Massachusetts
(Arlington Reservoir)

Map Scale: 1:2,280 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 20, Jun 9, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 11, 2019—Oct 5, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1	Water		7.3	47.2%
253B	Hinckley loamy sand, 3 to 8 percent slopes	A	7.2	46.4%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	A	0.8	5.4%
631C	Charlton-Urban land-Hollis complex, 3 to 15 percent slopes, rocky	A	0.2	1.1%
Totals for Area of Interest			**15.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Commonwealth of Massachusetts
City/Town of Arlington

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

Town of Arlington
Owner Name

210 Lowell Street
Street Address

Map/Lot #

Arlington
City

MA
State

02474
Zip Code

B. Site Information

1. (Check one) ☐ New Construction ☐ Upgrade ☐ Repair Test pits for drainage purposes

2. Soil Survey Available? ☒ Yes ☐ No If yes: Web Soil Survey (Source) 253B (Soil Map Unit)

   Hinckley Loamy Sand
   Soil Name

   Soil Limitations

   Sandy and gravelly glaciofluvial deposits
   Soil Parent material

   Landform

3. Surficial Geological Report Available? ☒ Yes ☐ No If yes: MassGIS Oliver (Year Published/Source) Map Unit

   Sand and gravel / till and bedrock
   Description of Geologic Map Unit:

4. Flood Rate Insurance Map Within a regulatory floodway? ☐ Yes ☒ No

5. Within a velocity zone? ☐ Yes ☒ No

6. Within a Mapped Wetland Area? ☐ Yes ☒ No If yes, MassGIS Wetland Data Layer: Wetland Type

7. Current Water Resource Conditions (USGS): 08/06/20 (Month/Day/ Year) Range: ☐ Above Normal ☒ Normal ☐ Below Normal

8. Other references reviewed:

Commonwealth of Massachusetts
City/Town of Arlington

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: TP-1 (Hole #) 08/06/20 (Date) 7:30 AM (Time) 70*, sunny (Weather) ______ (Latitude) ______ (Longitude:)

1. Land Use: Parking lot (e.g., woodland, agricultural field, vacant lot, etc.) None (Vegetation) Many large boulders (Surface Stones (e.g., cobbles, stones, boulders, etc.)) 0-2 (Slope (%))

   Description of Location: See attached sketch

2. Soil Parent Material: Till ______ (Landform) ______ (Position on Landscape (SU, SH, BS, FS, TS))

3. Distances from: Open Water Body >25 feet; Drainage Way N/A feet; Wetlands >25 feet; Property Line >10 feet; Drinking Water Well N/A feet; Other ______ feet

4. Unsuitable Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No If yes: 68" Depth Weeping from Pit ______ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-27	Fill										
27-38	A	Sandy Loam	10YR3/2						Massive	Friable	
38-44	B	Sandy Loam	10YR3/4						Massive	Friable	
44-84	C	Sandy Loam	10YR5/2	44"	High and Low Chroma	>2	2	10	Massive	Friable	

Additional Notes:

Commonwealth of Massachusetts
City/Town of Arlington

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: TP-2 (Hole #) 08/06/20 (Date) 7:45 AM (Time) 70*, sunny (Weather) ____ (Latitude) ____ (Longitude:)

1. Land Use Parking lot (e.g., woodland, agricultural field, vacant lot, etc.) None (Vegetation) Many large boulders (Surface Stones (e.g., cobbles, stones, boulders, etc.)) 0-2 (Slope (%))

   Description of Location: See attached sketch

2. Soil Parent Material: Till ____ (Landform) ____ (Position on Landscape (SU, SH, BS, FS, TS))

3. Distances from: Open Water Body >25 feet Drainage Way N/A feet Wetlands >25 feet
   Property Line >10 feet Drinking Water Well N/A feet Other ____ feet

4. Unsuitable Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: ____ Depth Weeping from Pit ____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-16	Fill										
16-30	A	Sandy Loam	10YR3/2						Massive	Friable	
30-43	B	Sandy Loam	10YR6/6	30"	High and Low Chroma	>2			Massive	Friable	
43-60	C	Sandy Loam	10YR5/3				2	10	Massive	Friable	

Additional Notes:

Commonwealth of Massachusetts
City/Town of Arlington

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: TP-3 (Hole #) 08/06/20 (Date) 8:00 AM (Time) 70*, sunny (Weather) ______ (Latitude) ______ (Longitude:)

1. Land Use Parking lot (e.g., woodland, agricultural field, vacant lot, etc.) None (Vegetation) Many large boulders (Surface Stones (e.g., cobbles, stones, boulders, etc.)) 0-2 (Slope (%))

   Description of Location: See attached sketch

2. Soil Parent Material: Till ______ (Landform) ______ (Position on Landscape (SU, SH, BS, FS, TS))

3. Distances from: Open Water Body >25 feet Drainage Way N/A feet Wetlands >25 feet
   Property Line >10 feet Drinking Water Well N/A feet Other ______ feet

4. Unsuitable Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: ______ Depth Weeping from Pit ______ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-9	Fill										
9-25	B	Sandy Loam	10YR6/6						Massive	Friable	
25-55	C	Sandy Loam	10YR5/3	32"	High and Low Chroma	>2	2	10	Massive	Friable	

Additional Notes:

Commonwealth of Massachusetts
City/Town of Arlington

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: TP-4 (Hole #) | 08/06/20 (Date) | 8:30 AM (Time) | 70*, sunny (Weather) | ____ (Latitude) | ____ (Longitude:)

1. Land Use: Parking lot (e.g., woodland, agricultural field, vacant lot, etc.) | None (Vegetation) | Many large boulders (Surface Stones (e.g., cobbles, stones, boulders, etc.)) | 0-2 (Slope (%))

   Description of Location: See attached sketch

2. Soil Parent Material: Till | ____ (Landform) | ____ (Position on Landscape (SU, SH, BS, FS, TS))

3. Distances from: Open Water Body >25 feet | Drainage Way N/A feet | Wetlands >25 feet
   Property Line >10 feet | Drinking Water Well N/A feet | Other ____ feet

4. Unsuitable Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: ____ Depth Weeping from Pit ____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-12	Fill										
12-61	C	Sandy Loam	10YR5/3	24"	High and Low Chroma	>2	2	10	Massive	Friable	

Additional Notes:

Commonwealth of Massachusetts
City/Town of Arlington

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

Signature of Soil Evaluator	08/06/20 Date
William Hall, P.E., S.E. 13592 Typed or Printed Name of Soil Evaluator / License #	06/31/21 Expiration Date of License
Leyna Tobey - Woodard & Curran Name of Approving Authority Witness	N/A Approving Authority

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Field Diagrams: Use this area for field diagrams:

See attached sketch

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO.	REVISION	DATE

kzla
Kyle Zick Landscape Architecture, Inc.
36 Bromfield Street Suite 202, Boston, MA 02108
617 451-1018 Tel
www.kylezick.com

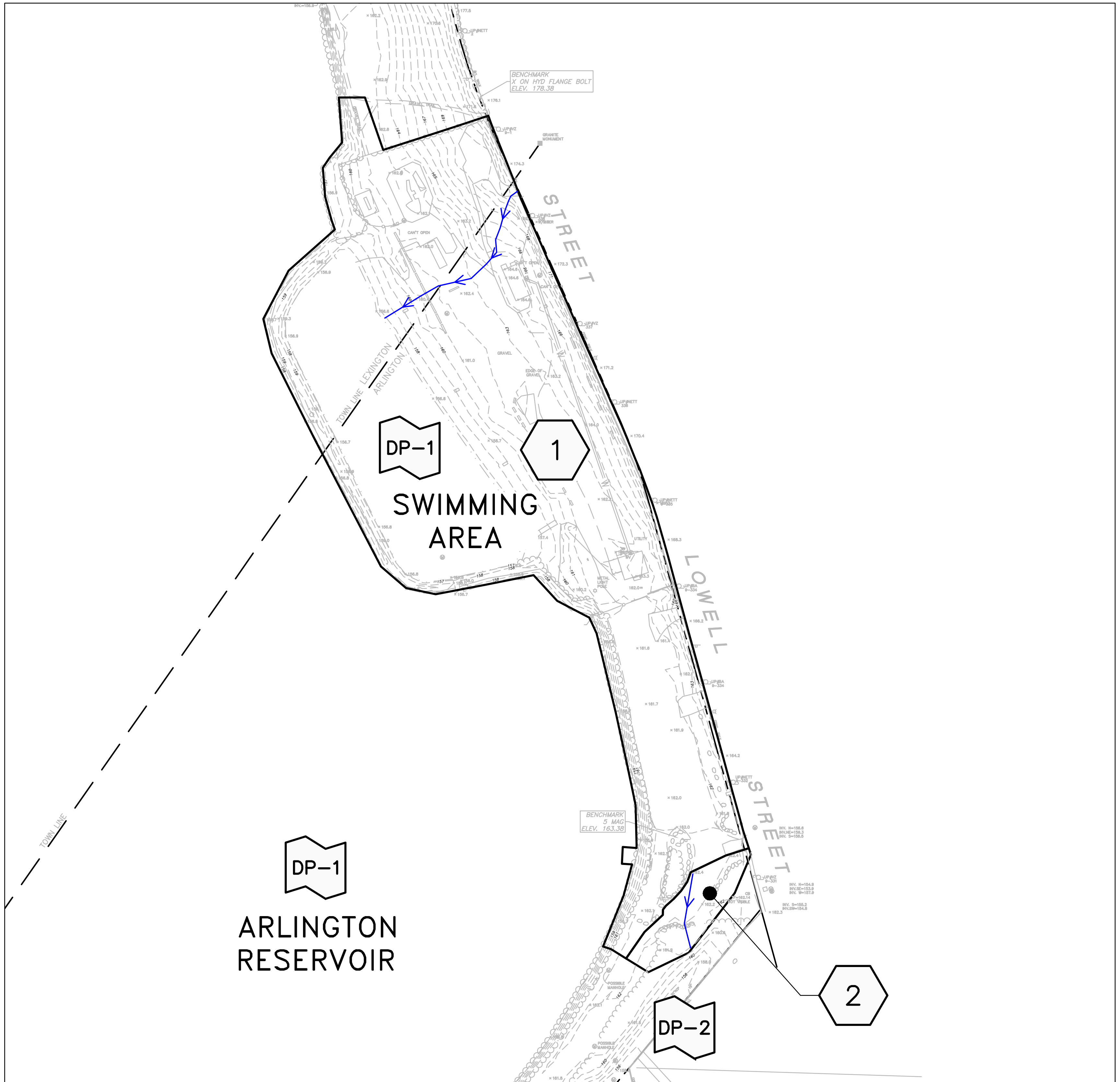
SCHEMATIC DESIGN SET

Job Number:
Project: ARLINGTON RES.
Drawn By: MD
Checked By: KZ
Date: JUNE 30, 2020
Scale: 1"=50'-0"
Drawing Title:

ENLARGEMENT PLAN

LX

APPENDIX C: STORMWATER FIGURES



N

LEGEND:

- SUBCATCHMENT AREA
- DESIGN POINT
- LONGEST FLOW PATH

150' 0 150' 300'

BAR SCALE
1" = 150'
CHECK GRAPHIC SCALE BEFORE USING

WOODARD & CURRAN
40 Shattuck Road, Suite 110
Andover, Massachusetts 01810
866.702.6371 | www.woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

PRE–DEVELOPMENT CATCHMENT FIGURE

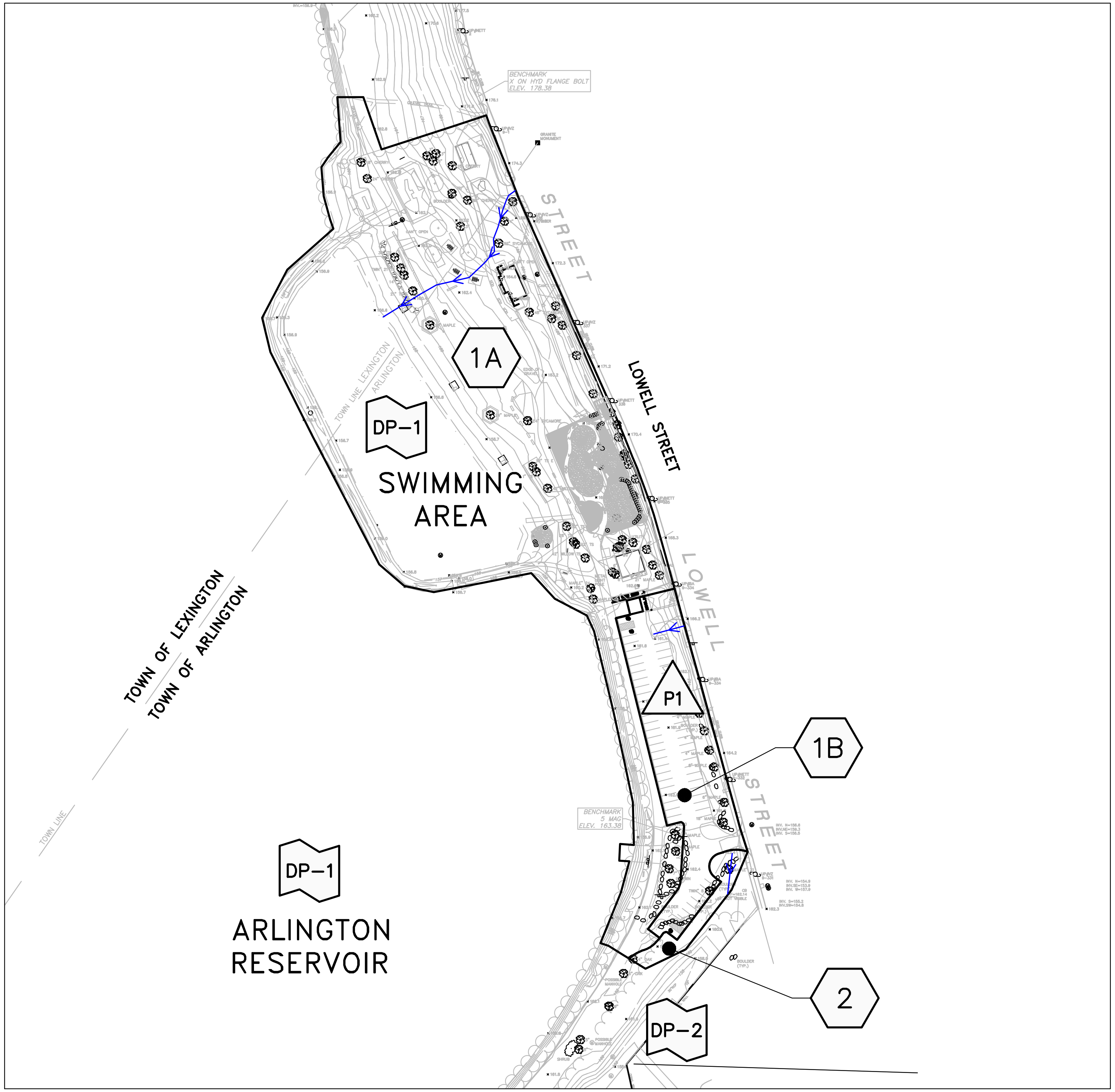
DESIGNED BY: LLT
DRAWN BY: LLT
CHECKED BY: BSM
2020.10.05 0233115.00–P*.dwg

TOWN OF ARLINGTON, MASSACHUSETTS
ARLINGTON RESERVOIR – PHASE 2

JOB NO: 0233115.00
DATE: OCTOBER 2020
SCALE: AS NOTED

FIGURE 1

\\woodardcurran.net\shared\Projects\0233115.00 KZLA Architects – Arlington Reservoir Phase 2\wip\Drawings\Civil\2020.10.05 0233115.00–PRE WATERSHED.dwg, Oct 05, 2020 – 3:32pm LTOBEY



LEGEND:

SUBCATCHMENT AREA

DESIGN POINT

POND

LONGEST FLOW PATH

150' 0 150' 300'

BAR SCALE
1" = 150'
CHECK GRAPHIC SCALE BEFORE USING

WOODARD & CURRAN
40 Shattuck Road, Suite 110
Andover, Massachusetts 01810
866.702.6371 | www.woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

POST–DEVELOPMENT
CATCHMENT FIGURE

DESIGNED BY: LLT
DRAWN BY: LLT
CHECKED BY: BSM
2020.09.29 0233115.00–P*.dwg

TOWN OF ARLINGTON, MASSACHUSETTS

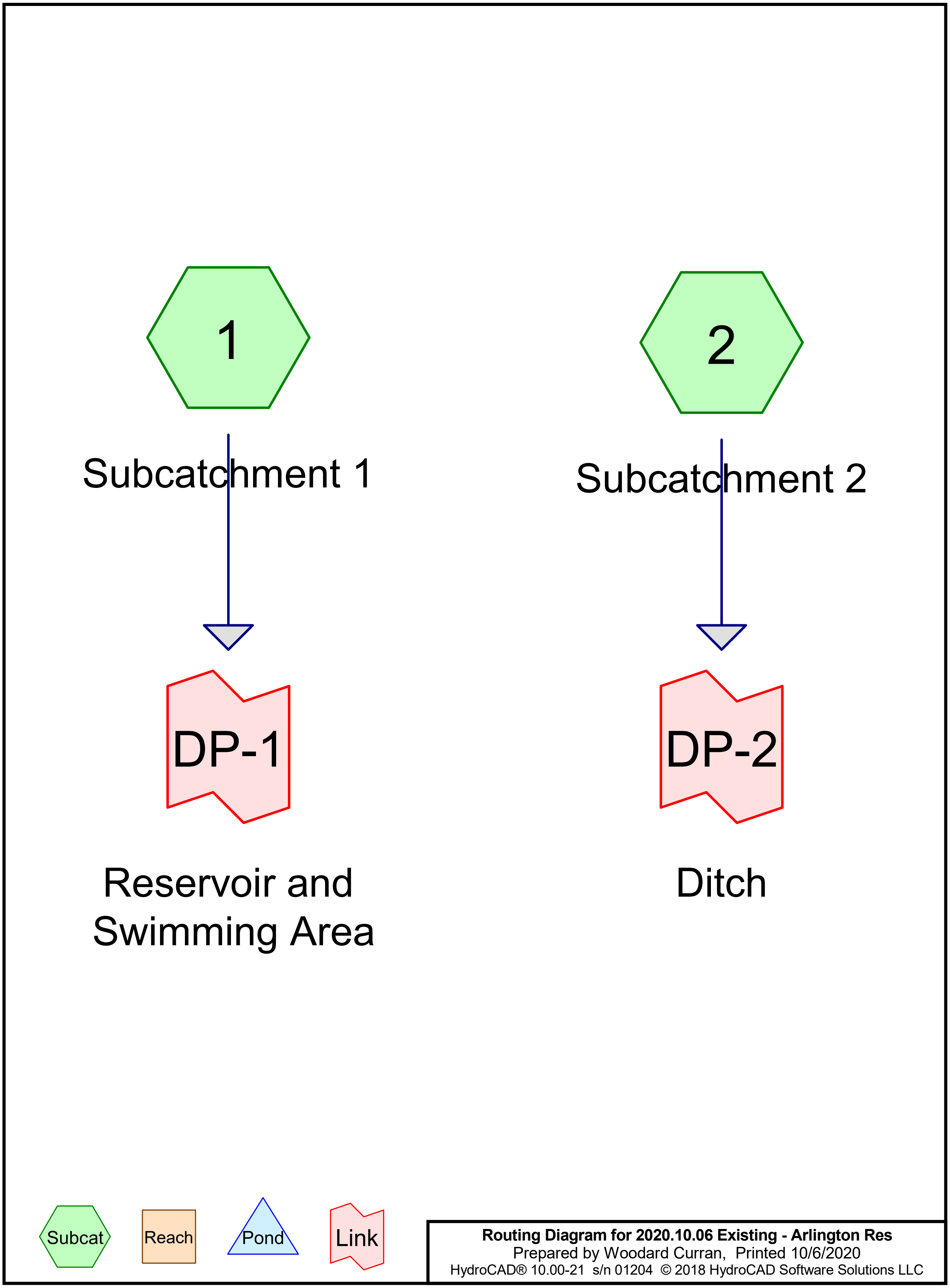
ARLINGTON RESERVOIR – PHASE 2

JOB NO: 0233115.00
DATE: OCTOBER 2020
SCALE: AS NOTED

FIGURE 2

\\woodardcurran.net\shared\Projects\0233115.00 KZLA Architects – Arlington Reservoir Phase 2\wip\Drawings\Civil\2020.09.29 0233115.00–POST WATERSHED.dwg, Oct 06, 2020 – 1:51pm LTOBEY

APPENDIX D: HYDROCAD STORMWATER MODEL REPORTS



Routing Diagram for 2020.10.06 Existing - Arlington Res
Prepared by Woodard Curran, Printed 10/6/2020
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.531	49	50-75% Grass cover, Fair, HSG A (1, 2)
1.317	63	Beach Sand, HSG A (1)
0.379	30	Brush, Good, HSG A (1, 2)
0.046	96	Dense Sand Path, HSG A (1)
0.646	98	Gravel parking, HSG A (1, 2)
0.234	98	Impervious Surface, HSG A (1, 2)
0.055	39	Open Space, Good, HSG A (>75% Grass Cover) (1)
1.207	98	Water Surface, HSG A (1)
5.416	**70**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
5.416	HSG A	1, 2
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
5.416		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
1.531	0.000	0.000	0.000	0.000	1.531	50-75% Grass cover, Fair	1, 2
1.317	0.000	0.000	0.000	0.000	1.317	Beach Sand	1
0.379	0.000	0.000	0.000	0.000	0.379	Brush, Good	1, 2
0.046	0.000	0.000	0.000	0.000	0.046	Dense Sand Path	1
0.646	0.000	0.000	0.000	0.000	0.646	Gravel parking	1, 2
0.234	0.000	0.000	0.000	0.000	0.234	Impervious Surface	1, 2
0.055	0.000	0.000	0.000	0.000	0.055	Open Space, Good	1
1.207	0.000	0.000	0.000	0.000	1.207	Water Surface	1
5.416	**0.000**	**0.000**	**0.000**	**0.000**	**5.416**	**TOTAL AREA**	

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=227,252 sf 38.51% Impervious Runoff Depth=0.58"
Tc=6.0 min CN=71 Runoff=2.96 cfs 0.251 af

Subcatchment 2: Subcatchment 2 Runoff Area=8,681 sf 39.47% Impervious Runoff Depth=0.33"
Tc=6.0 min CN=64 Runoff=0.04 cfs 0.006 af

Link DP-1: Reservoir and Swimming Area Inflow=2.96 cfs 0.251 af
Primary=2.96 cfs 0.251 af

Link DP-2: Ditch Inflow=0.04 cfs 0.006 af
Primary=0.04 cfs 0.006 af

Total Runoff Area = 5.416 ac Runoff Volume = 0.257 af Average Runoff Depth = 0.57"
61.46% Pervious = 3.329 ac 38.54% Impervious = 2.088 ac

Summary for Subcatchment 1: Subcatchment 1

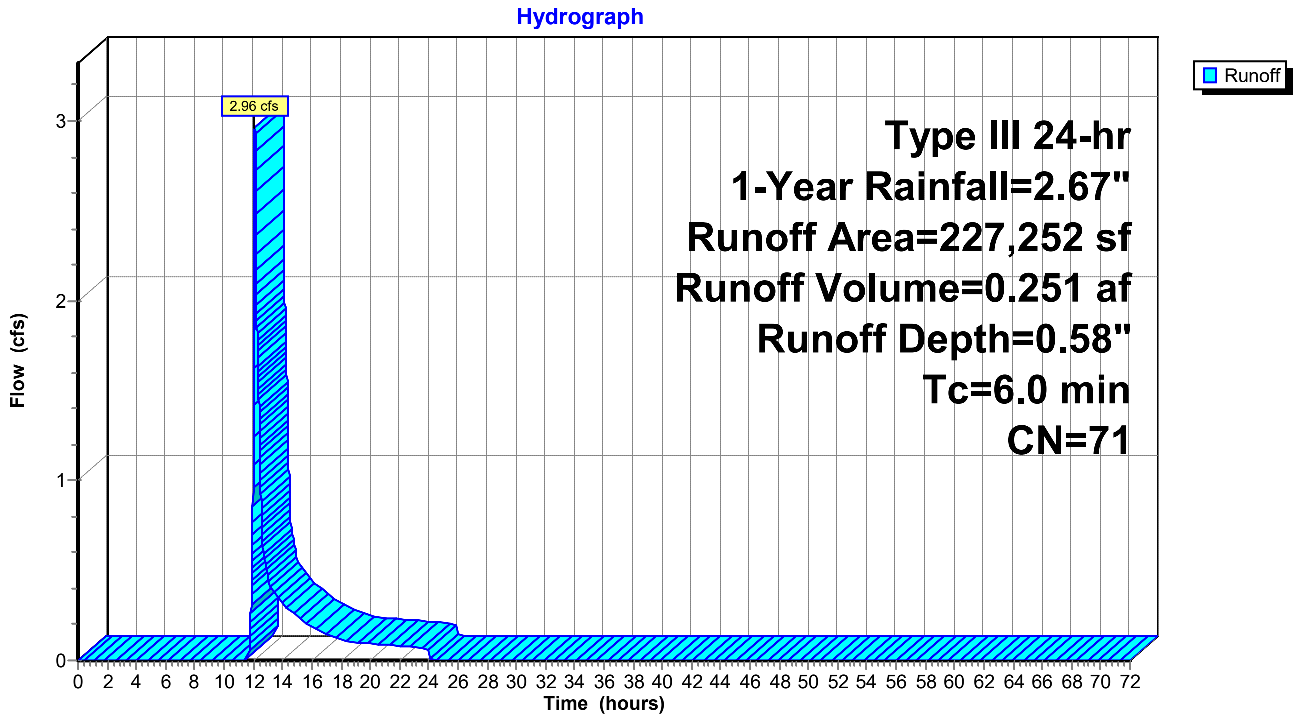
Runoff = 2.96 cfs @ 12.10 hrs, Volume= 0.251 af, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.67"

	Area (sf)	CN	Description
	14,435	30	Brush, Good, HSG A
*	57,370	63	Beach Sand, HSG A
*	1,998	96	Dense Sand Path, HSG A
	63,530	49	50-75% Grass cover, Fair, HSG A
*	24,927	98	Gravel parking, HSG A
*	9,994	98	Impervious Surface, HSG A
	52,585	98	Water Surface, HSG A
*	2,413	39	Open Space, Good, HSG A (>75% Grass Cover)
	227,252	71	Weighted Average
	139,746		61.49% Pervious Area
	87,506		38.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1: Subcatchment 1



Summary for Subcatchment 2: Subcatchment 2

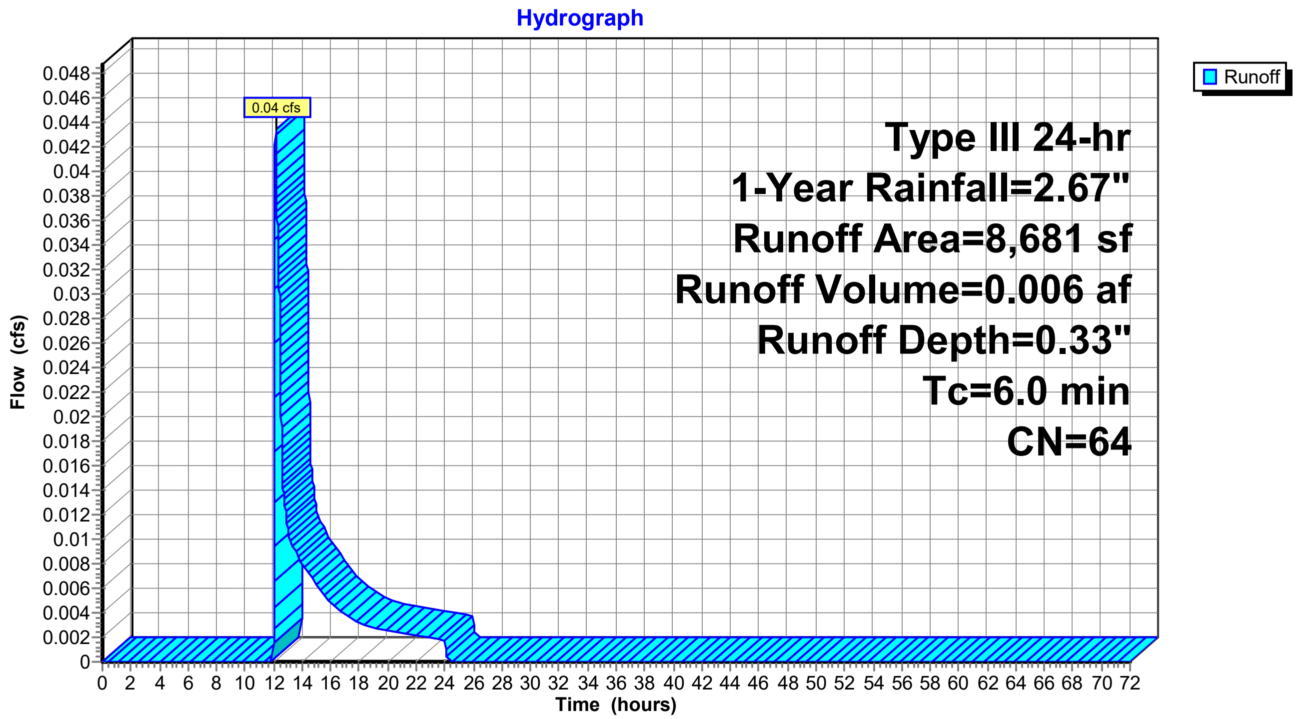
Runoff = 0.04 cfs @ 12.13 hrs, Volume= 0.006 af, Depth= 0.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.67"

	Area (sf)	CN	Description
	2,076	30	Brush, Good, HSG A
	3,179	49	50-75% Grass cover, Fair, HSG A
*	3,211	98	Gravel parking, HSG A
	215	98	Impervious Surface, HSG A
	8,681	64	Weighted Average
	5,255		60.53% Pervious Area
	3,426		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2

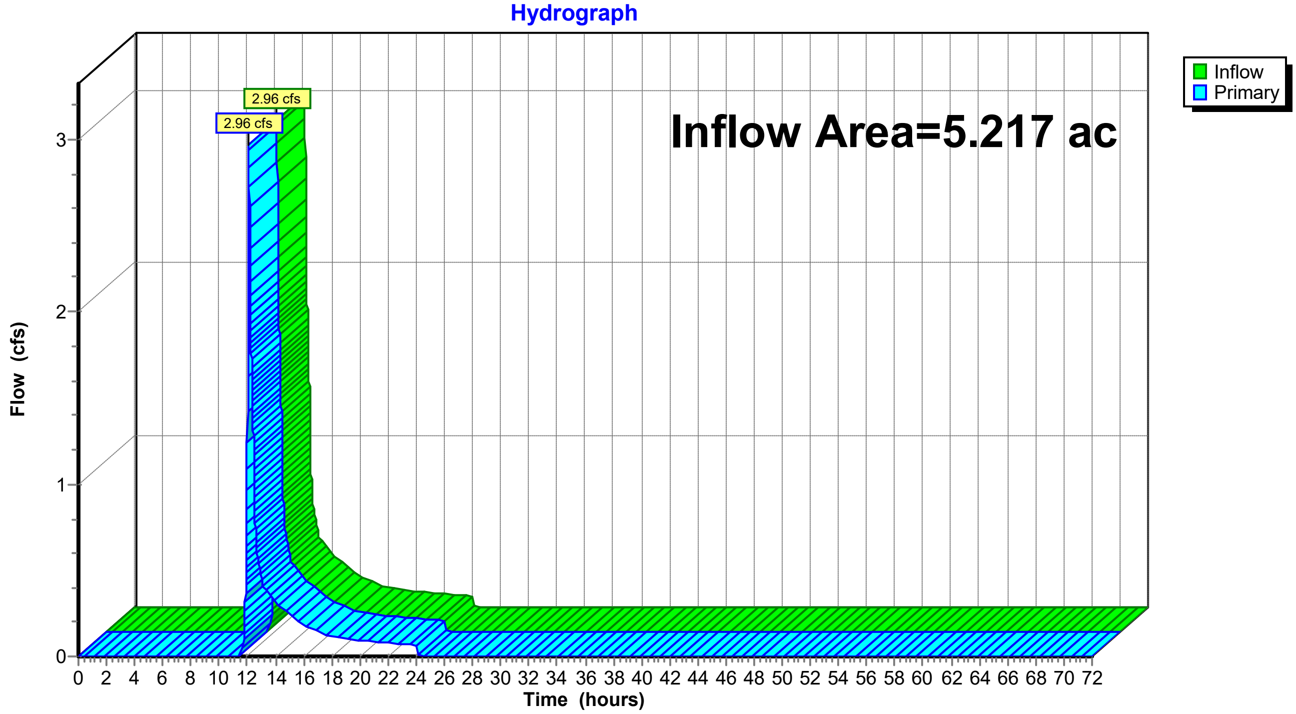


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area = 5.217 ac, 38.51% Impervious, Inflow Depth = 0.58" for 1-Year event
Inflow = 2.96 cfs @ 12.10 hrs, Volume= 0.251 af
Primary = 2.96 cfs @ 12.10 hrs, Volume= 0.251 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

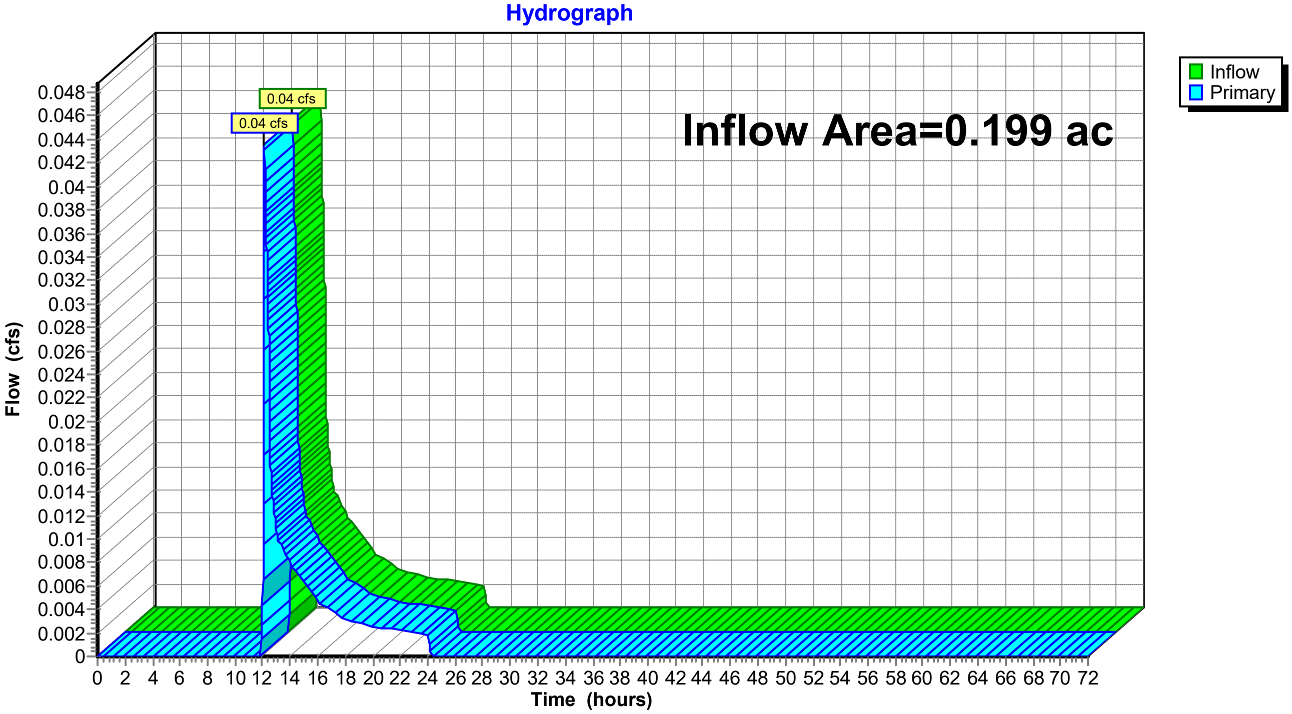


Summary for Link DP-2: Ditch

Inflow Area = 0.199 ac, 39.47% Impervious, Inflow Depth = 0.33" for 1-Year event
Inflow = 0.04 cfs @ 12.13 hrs, Volume= 0.006 af
Primary = 0.04 cfs @ 12.13 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=227,252 sf 38.51% Impervious Runoff Depth=0.88"
Tc=6.0 min CN=71 Runoff=4.93 cfs 0.384 af

Subcatchment 2: Subcatchment 2 Runoff Area=8,681 sf 39.47% Impervious Runoff Depth=0.56"
Tc=6.0 min CN=64 Runoff=0.10 cfs 0.009 af

Link DP-1: Reservoir and Swimming Area Inflow=4.93 cfs 0.384 af
Primary=4.93 cfs 0.384 af

Link DP-2: Ditch Inflow=0.10 cfs 0.009 af
Primary=0.10 cfs 0.009 af

Total Runoff Area = 5.416 ac Runoff Volume = 0.394 af Average Runoff Depth = 0.87"
61.46% Pervious = 3.329 ac 38.54% Impervious = 2.088 ac

Summary for Subcatchment 1: Subcatchment 1

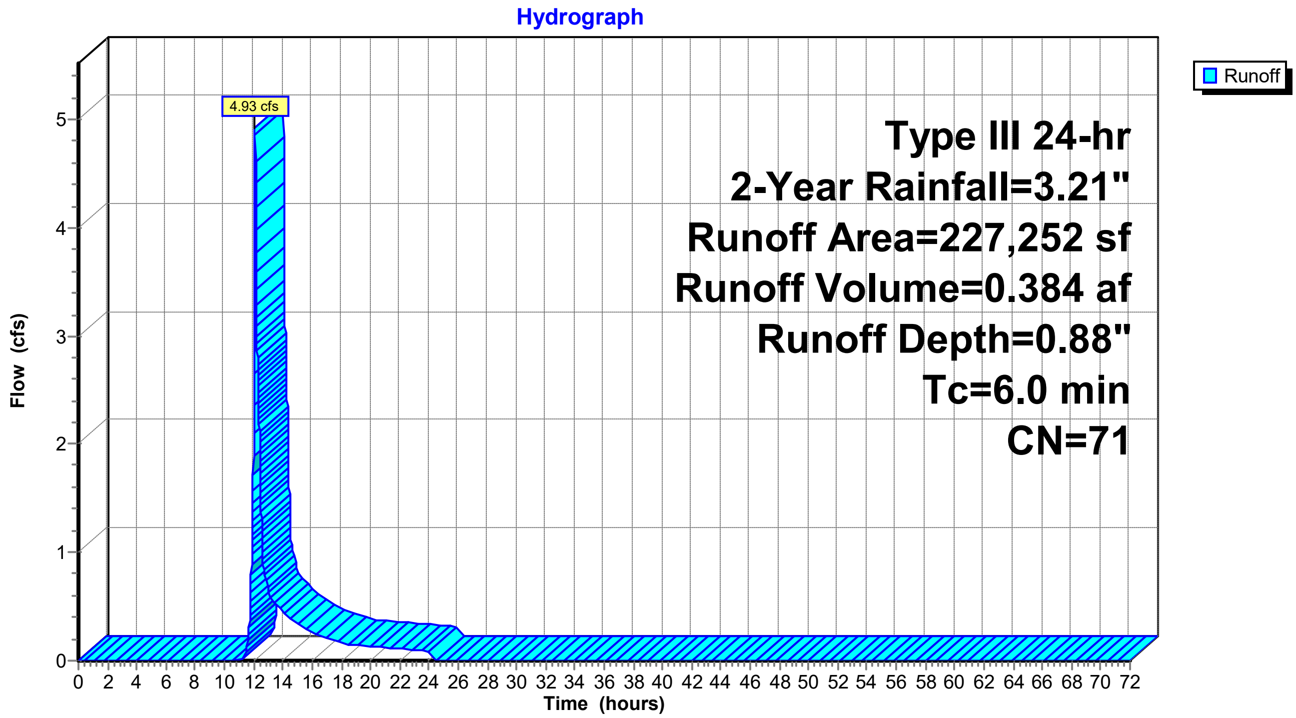
Runoff = 4.93 cfs @ 12.10 hrs, Volume= 0.384 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.21"

	Area (sf)	CN	Description
	14,435	30	Brush, Good, HSG A
*	57,370	63	Beach Sand, HSG A
*	1,998	96	Dense Sand Path, HSG A
	63,530	49	50-75% Grass cover, Fair, HSG A
*	24,927	98	Gravel parking, HSG A
*	9,994	98	Impervious Surface, HSG A
	52,585	98	Water Surface, HSG A
*	2,413	39	Open Space, Good, HSG A (>75% Grass Cover)
	227,252	71	Weighted Average
	139,746		61.49% Pervious Area
	87,506		38.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1: Subcatchment 1



Summary for Subcatchment 2: Subcatchment 2

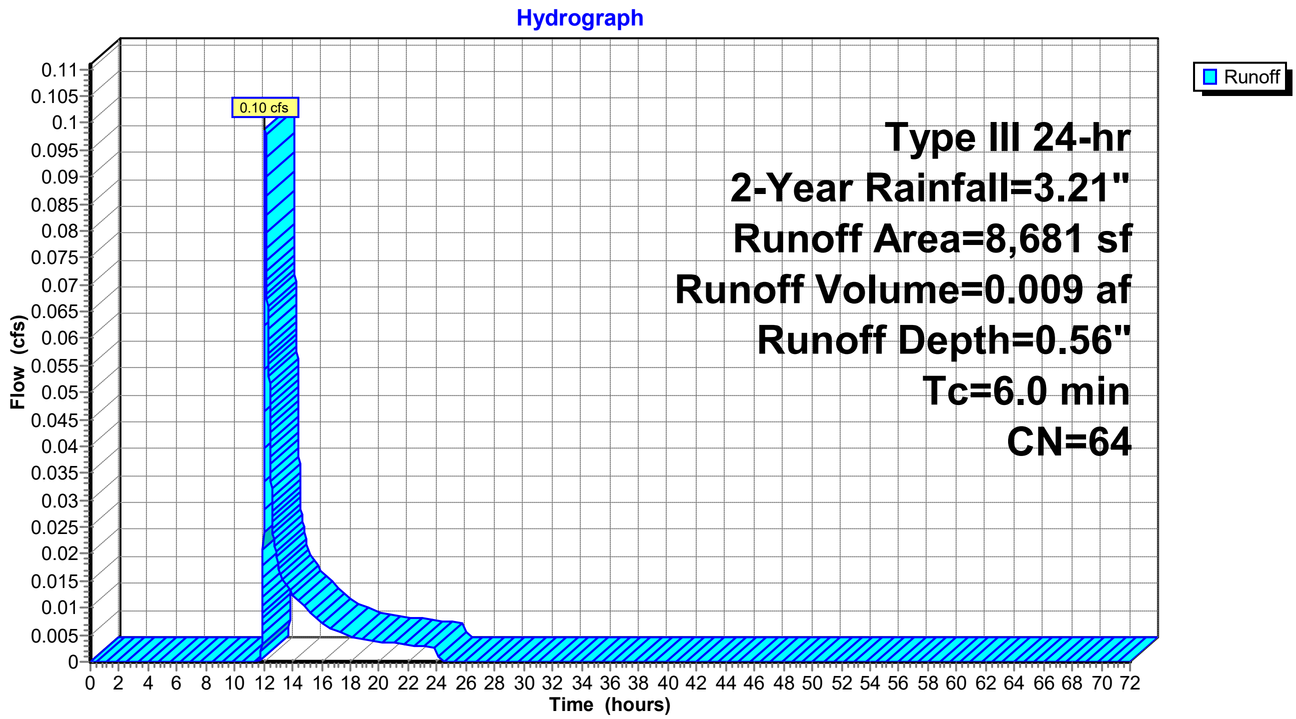
Runoff = 0.10 cfs @ 12.11 hrs, Volume= 0.009 af, Depth= 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.21"

	Area (sf)	CN	Description
	2,076	30	Brush, Good, HSG A
	3,179	49	50-75% Grass cover, Fair, HSG A
*	3,211	98	Gravel parking, HSG A
	215	98	Impervious Surface, HSG A
	8,681	64	Weighted Average
	5,255		60.53% Pervious Area
	3,426		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2

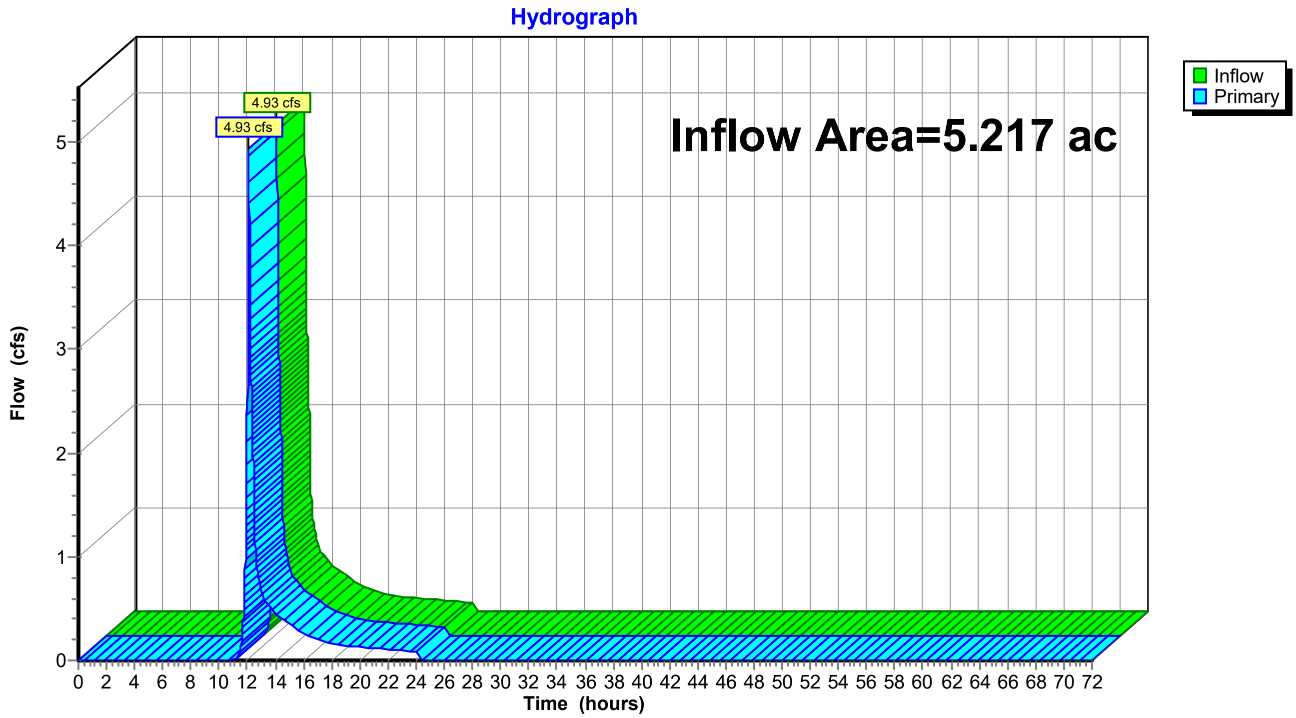


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.217 ac, 38.51% Impervious, Inflow Depth = 0.88" for 2-Year event			
Inflow =	4.93 cfs @	12.10 hrs, Volume=	0.384 af	
Primary =	4.93 cfs @	12.10 hrs, Volume=	0.384 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

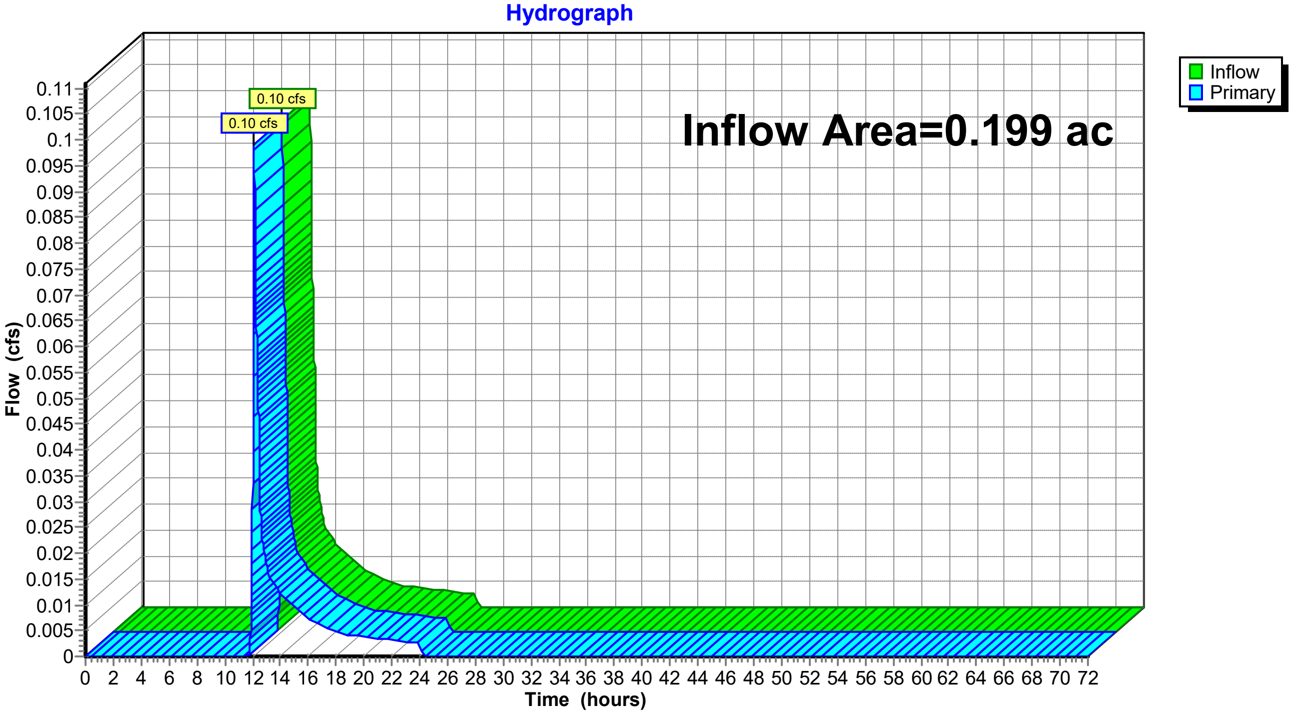


Summary for Link DP-2: Ditch

Inflow Area =	0.199 ac, 39.47% Impervious, Inflow Depth = 0.56"	for 2-Year event	
Inflow =	0.10 cfs @ 12.11 hrs, Volume=	0.009 af	
Primary =	0.10 cfs @ 12.11 hrs, Volume=	0.009 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=227,252 sf 38.51% Impervious Runoff Depth=2.01"
Tc=6.0 min CN=71 Runoff=12.11 cfs 0.874 af

Subcatchment 2: Subcatchment 2 Runoff Area=8,681 sf 39.47% Impervious Runoff Depth=1.49"
Tc=6.0 min CN=64 Runoff=0.33 cfs 0.025 af

Link DP-1: Reservoir and Swimming Area Inflow=12.11 cfs 0.874 af
Primary=12.11 cfs 0.874 af

Link DP-2: Ditch Inflow=0.33 cfs 0.025 af
Primary=0.33 cfs 0.025 af

Total Runoff Area = 5.416 ac Runoff Volume = 0.899 af Average Runoff Depth = 1.99"
61.46% Pervious = 3.329 ac 38.54% Impervious = 2.088 ac

Summary for Subcatchment 1: Subcatchment 1

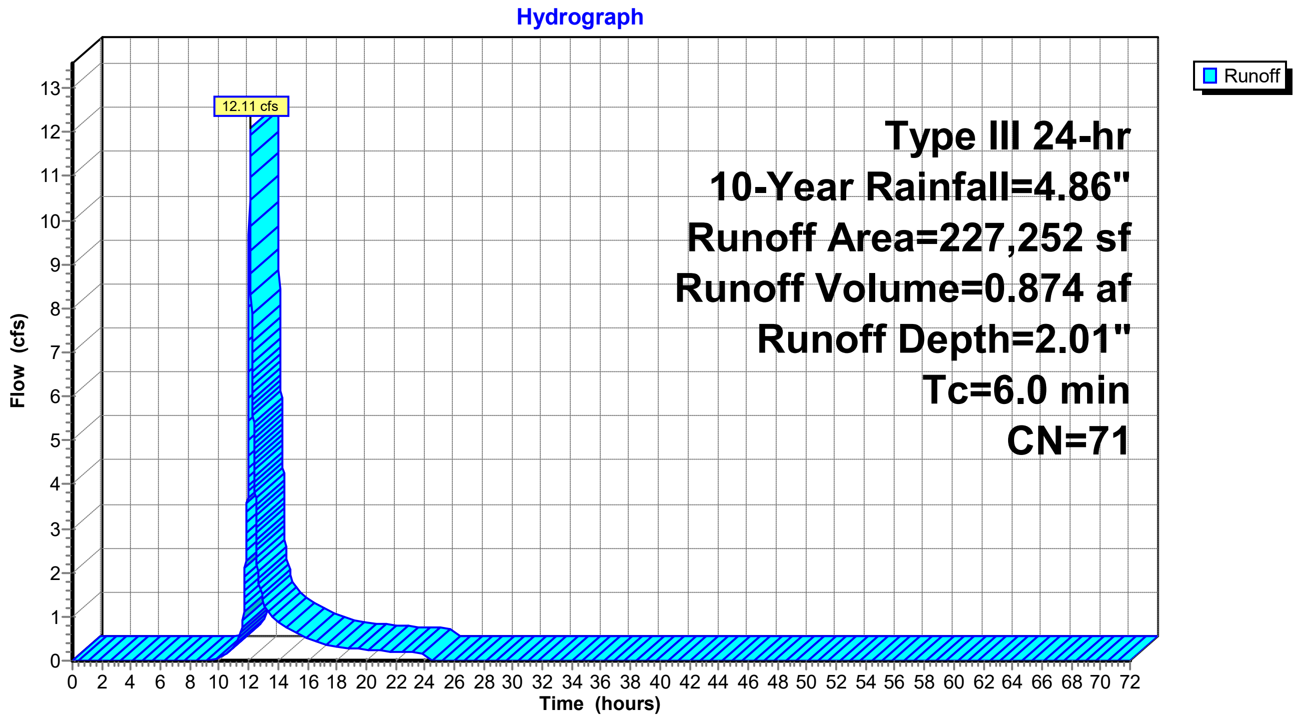
Runoff = 12.11 cfs @ 12.09 hrs, Volume= 0.874 af, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
	14,435	30	Brush, Good, HSG A
*	57,370	63	Beach Sand, HSG A
*	1,998	96	Dense Sand Path, HSG A
	63,530	49	50-75% Grass cover, Fair, HSG A
*	24,927	98	Gravel parking, HSG A
*	9,994	98	Impervious Surface, HSG A
	52,585	98	Water Surface, HSG A
*	2,413	39	Open Space, Good, HSG A (>75% Grass Cover)
	227,252	71	Weighted Average
	139,746		61.49% Pervious Area
	87,506		38.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1: Subcatchment 1



Summary for Subcatchment 2: Subcatchment 2

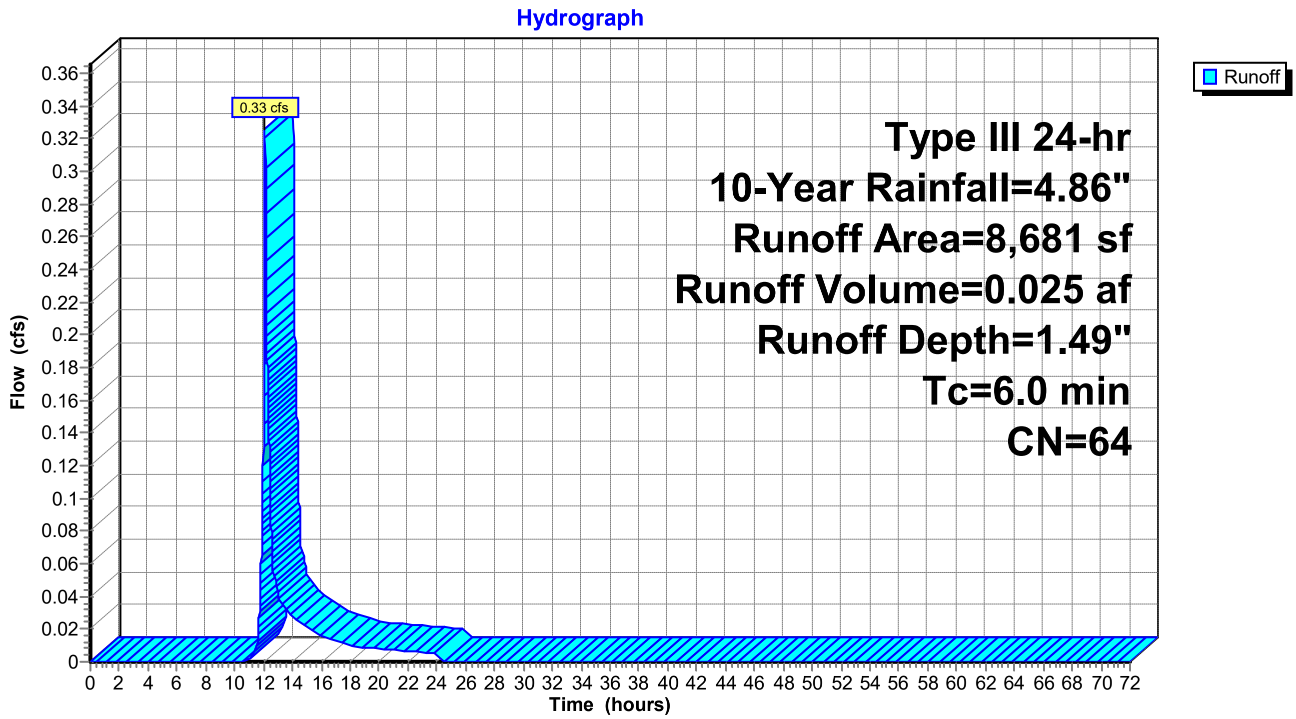
Runoff = 0.33 cfs @ 12.10 hrs, Volume= 0.025 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
	2,076	30	Brush, Good, HSG A
	3,179	49	50-75% Grass cover, Fair, HSG A
*	3,211	98	Gravel parking, HSG A
	215	98	Impervious Surface, HSG A
	8,681	64	Weighted Average
	5,255		60.53% Pervious Area
	3,426		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2

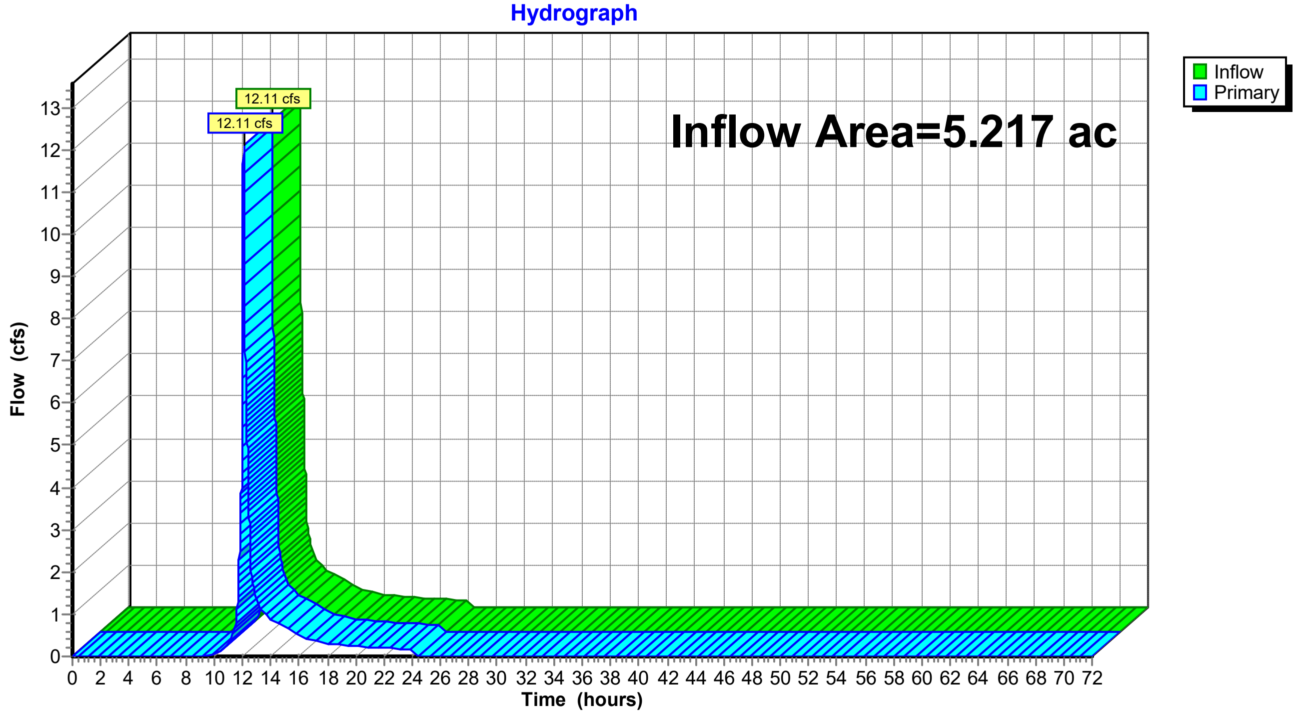


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.217 ac, 38.51% Impervious, Inflow Depth = 2.01"		for 10-Year event
Inflow =	12.11 cfs @ 12.09 hrs, Volume=	0.874 af	
Primary =	12.11 cfs @ 12.09 hrs, Volume=	0.874 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

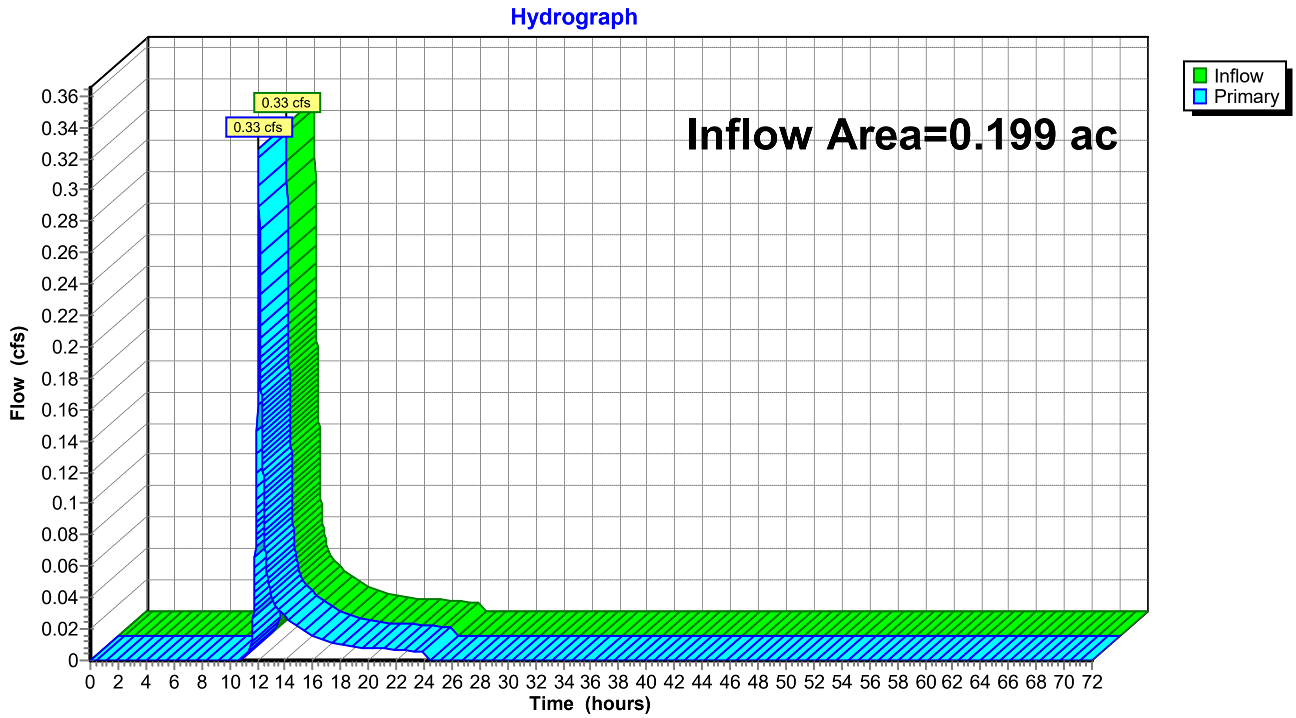


Summary for Link DP-2: Ditch

Inflow Area = 0.199 ac, 39.47% Impervious, Inflow Depth = 1.49" for 10-Year event
Inflow = 0.33 cfs @ 12.10 hrs, Volume= 0.025 af
Primary = 0.33 cfs @ 12.10 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=227,252 sf 38.51% Impervious Runoff Depth=3.04"
Tc=6.0 min CN=71 Runoff=18.53 cfs 1.320 af

Subcatchment 2: Subcatchment 2 Runoff Area=8,681 sf 39.47% Impervious Runoff Depth=2.39"
Tc=6.0 min CN=64 Runoff=0.54 cfs 0.040 af

Link DP-1: Reservoir and Swimming Area Inflow=18.53 cfs 1.320 af
Primary=18.53 cfs 1.320 af

Link DP-2: Ditch Inflow=0.54 cfs 0.040 af
Primary=0.54 cfs 0.040 af

Total Runoff Area = 5.416 ac Runoff Volume = 1.360 af Average Runoff Depth = 3.01"
61.46% Pervious = 3.329 ac 38.54% Impervious = 2.088 ac

Summary for Subcatchment 1: Subcatchment 1

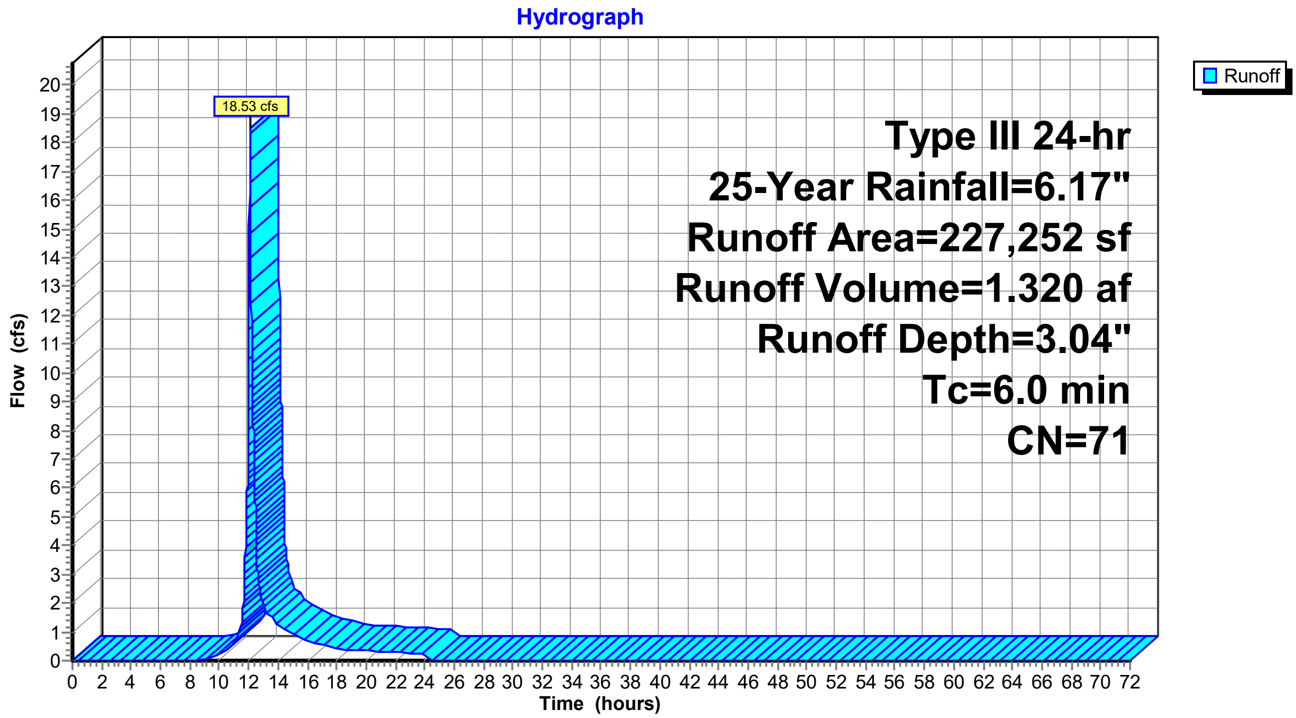
Runoff = 18.53 cfs @ 12.09 hrs, Volume= 1.320 af, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.17"

	Area (sf)	CN	Description
	14,435	30	Brush, Good, HSG A
*	57,370	63	Beach Sand, HSG A
*	1,998	96	Dense Sand Path, HSG A
	63,530	49	50-75% Grass cover, Fair, HSG A
*	24,927	98	Gravel parking, HSG A
*	9,994	98	Impervious Surface, HSG A
	52,585	98	Water Surface, HSG A
*	2,413	39	Open Space, Good, HSG A (>75% Grass Cover)
	227,252	71	Weighted Average
	139,746		61.49% Pervious Area
	87,506		38.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1: Subcatchment 1



Summary for Subcatchment 2: Subcatchment 2

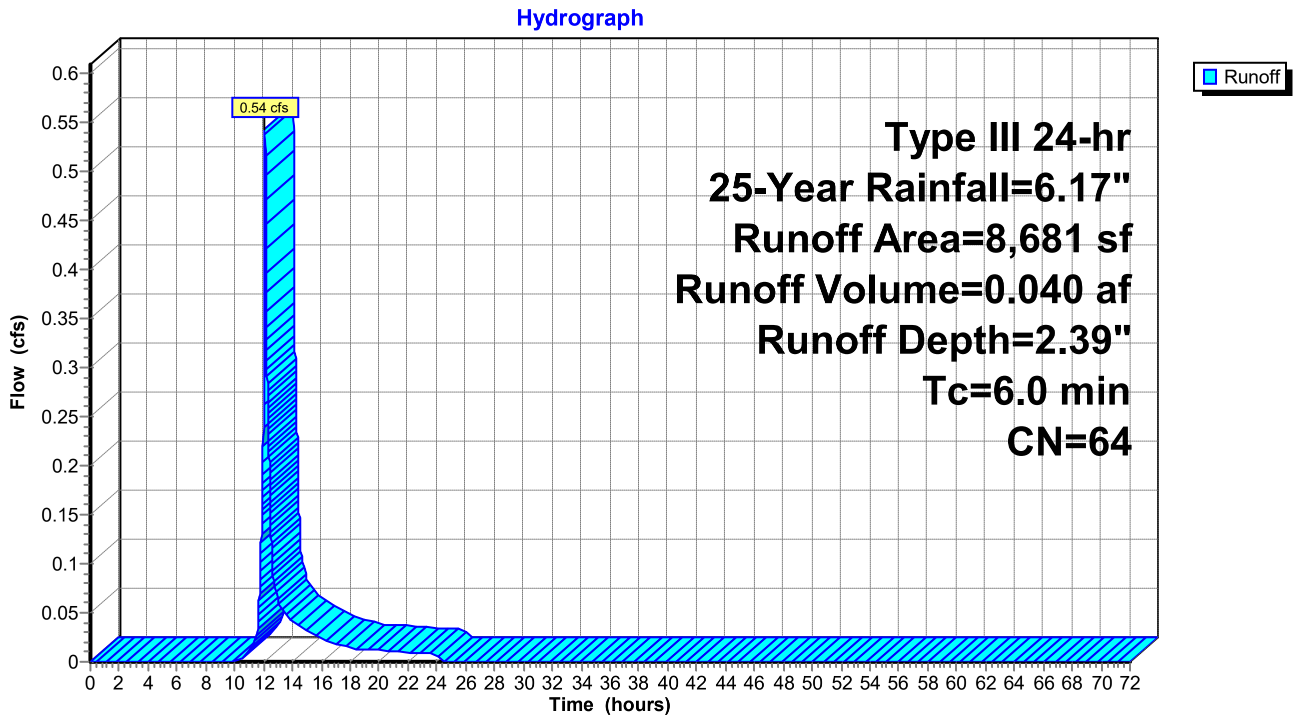
Runoff = 0.54 cfs @ 12.09 hrs, Volume= 0.040 af, Depth= 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.17"

	Area (sf)	CN	Description
	2,076	30	Brush, Good, HSG A
	3,179	49	50-75% Grass cover, Fair, HSG A
*	3,211	98	Gravel parking, HSG A
	215	98	Impervious Surface, HSG A
	8,681	64	Weighted Average
	5,255		60.53% Pervious Area
	3,426		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2

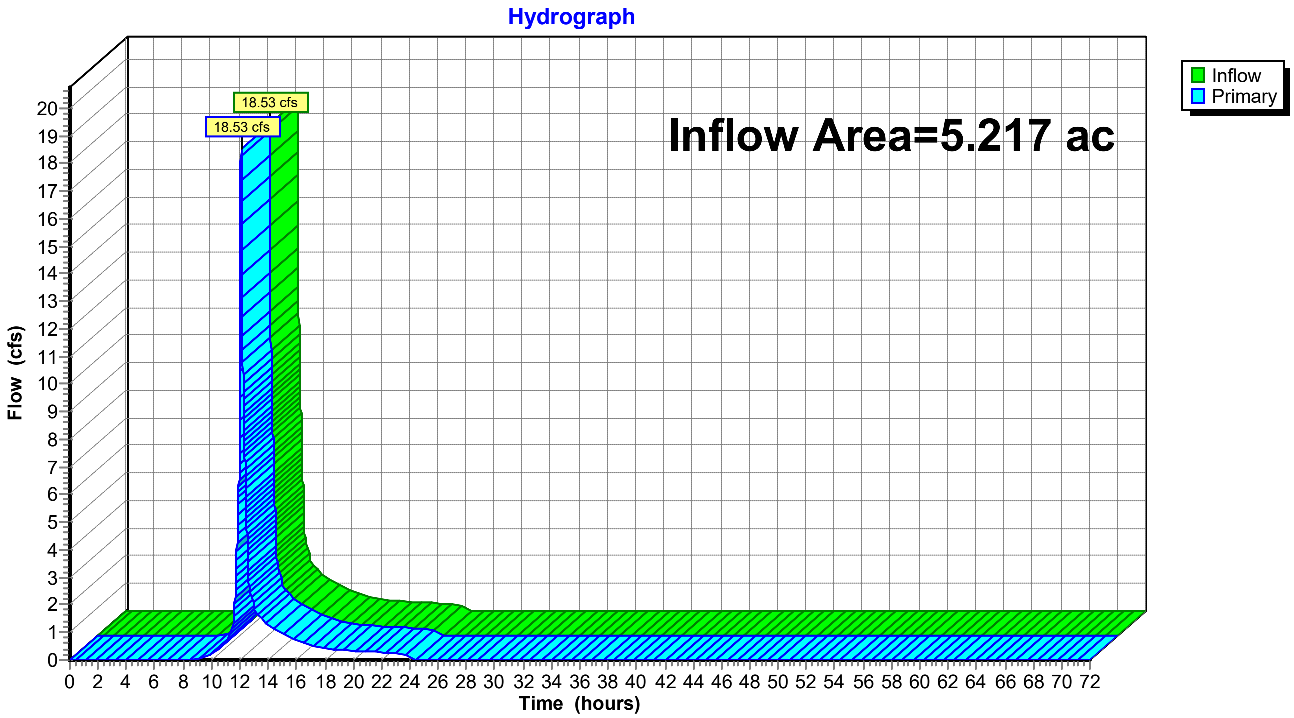


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.217 ac,	38.51% Impervious,	Inflow Depth = 3.04"	for 25-Year event
Inflow =	18.53 cfs @	12.09 hrs, Volume=	1.320 af	
Primary =	18.53 cfs @	12.09 hrs, Volume=	1.320 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

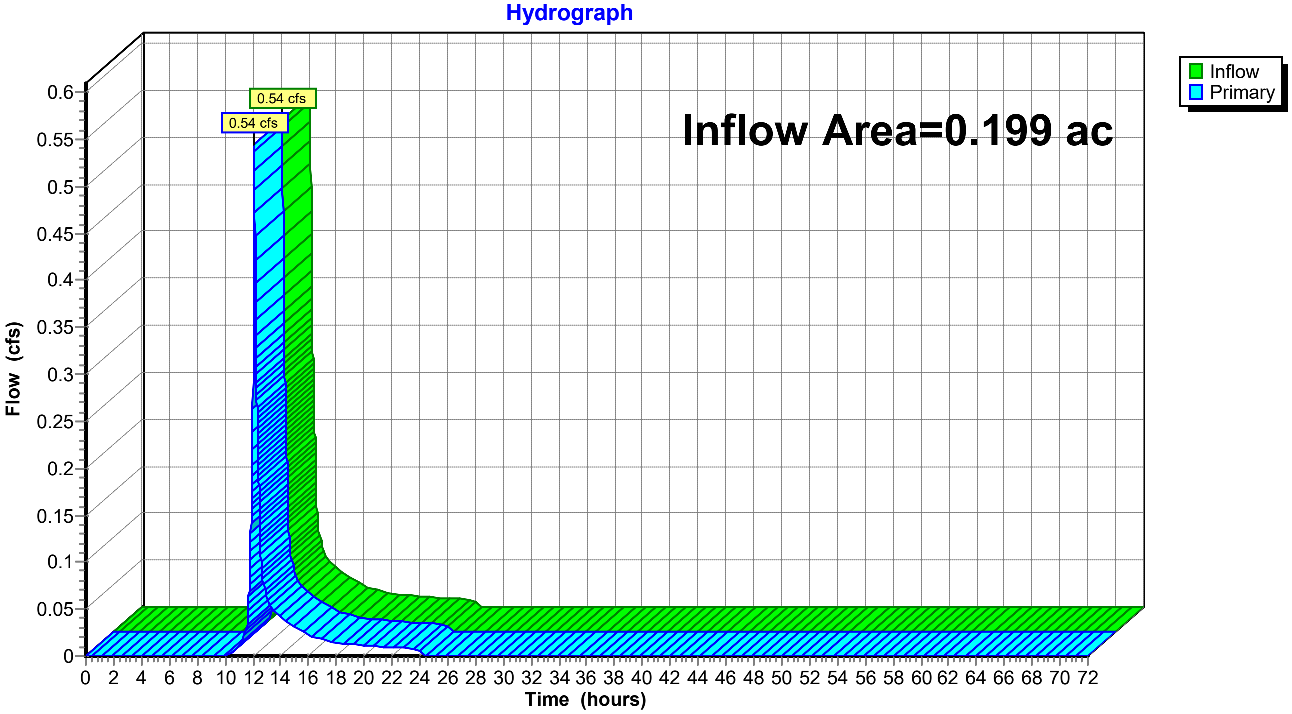


Summary for Link DP-2: Ditch

Inflow Area = 0.199 ac, 39.47% Impervious, Inflow Depth = 2.39" for 25-Year event
Inflow = 0.54 cfs @ 12.09 hrs, Volume= 0.040 af
Primary = 0.54 cfs @ 12.09 hrs, Volume= 0.040 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=227,252 sf 38.51% Impervious Runoff Depth=5.33"
Tc=6.0 min CN=71 Runoff=32.53 cfs 2.315 af

Subcatchment 2: Subcatchment 2 Runoff Area=8,681 sf 39.47% Impervious Runoff Depth=4.47"
Tc=6.0 min CN=64 Runoff=1.04 cfs 0.074 af

Link DP-1: Reservoir and Swimming Area Inflow=32.53 cfs 2.315 af
Primary=32.53 cfs 2.315 af

Link DP-2: Ditch Inflow=1.04 cfs 0.074 af
Primary=1.04 cfs 0.074 af

Total Runoff Area = 5.416 ac Runoff Volume = 2.389 af Average Runoff Depth = 5.29"
61.46% Pervious = 3.329 ac 38.54% Impervious = 2.088 ac

Summary for Subcatchment 1: Subcatchment 1

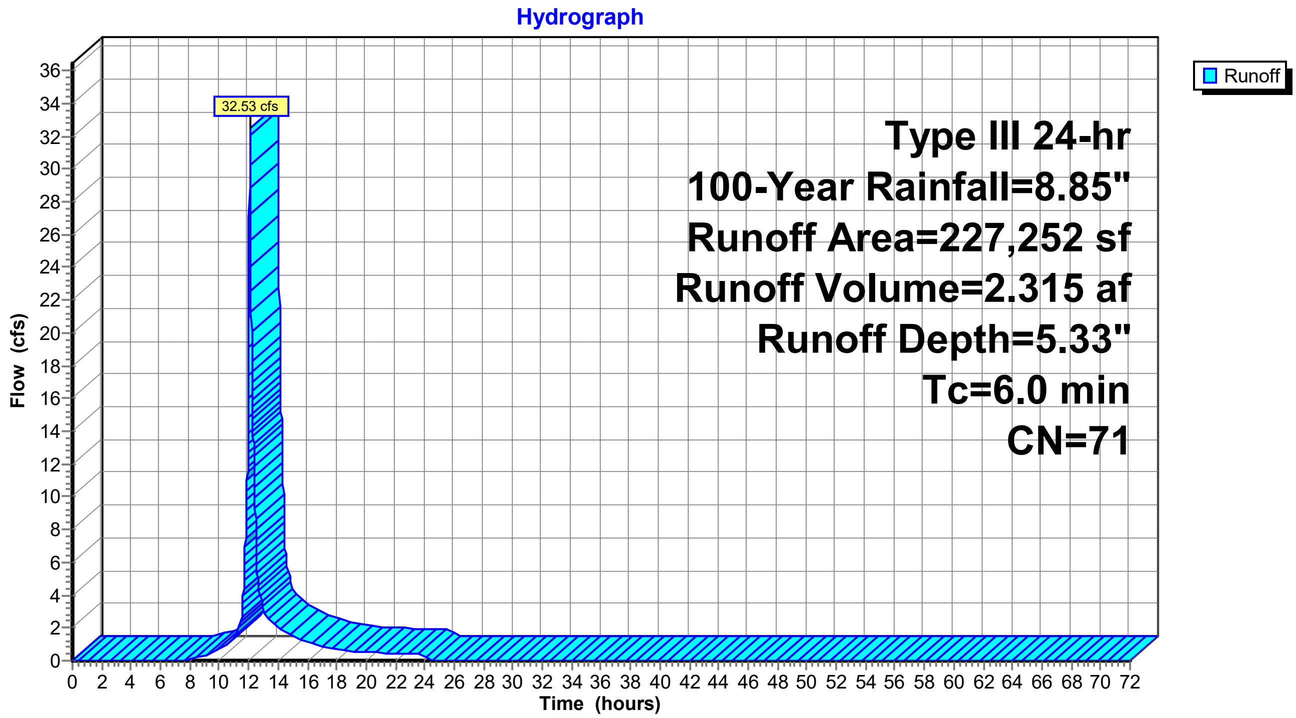
Runoff = 32.53 cfs @ 12.09 hrs, Volume= 2.315 af, Depth= 5.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.85"

	Area (sf)	CN	Description
	14,435	30	Brush, Good, HSG A
*	57,370	63	Beach Sand, HSG A
*	1,998	96	Dense Sand Path, HSG A
	63,530	49	50-75% Grass cover, Fair, HSG A
*	24,927	98	Gravel parking, HSG A
*	9,994	98	Impervious Surface, HSG A
	52,585	98	Water Surface, HSG A
*	2,413	39	Open Space, Good, HSG A (>75% Grass Cover)
	227,252	71	Weighted Average
	139,746		61.49% Pervious Area
	87,506		38.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1: Subcatchment 1



Summary for Subcatchment 2: Subcatchment 2

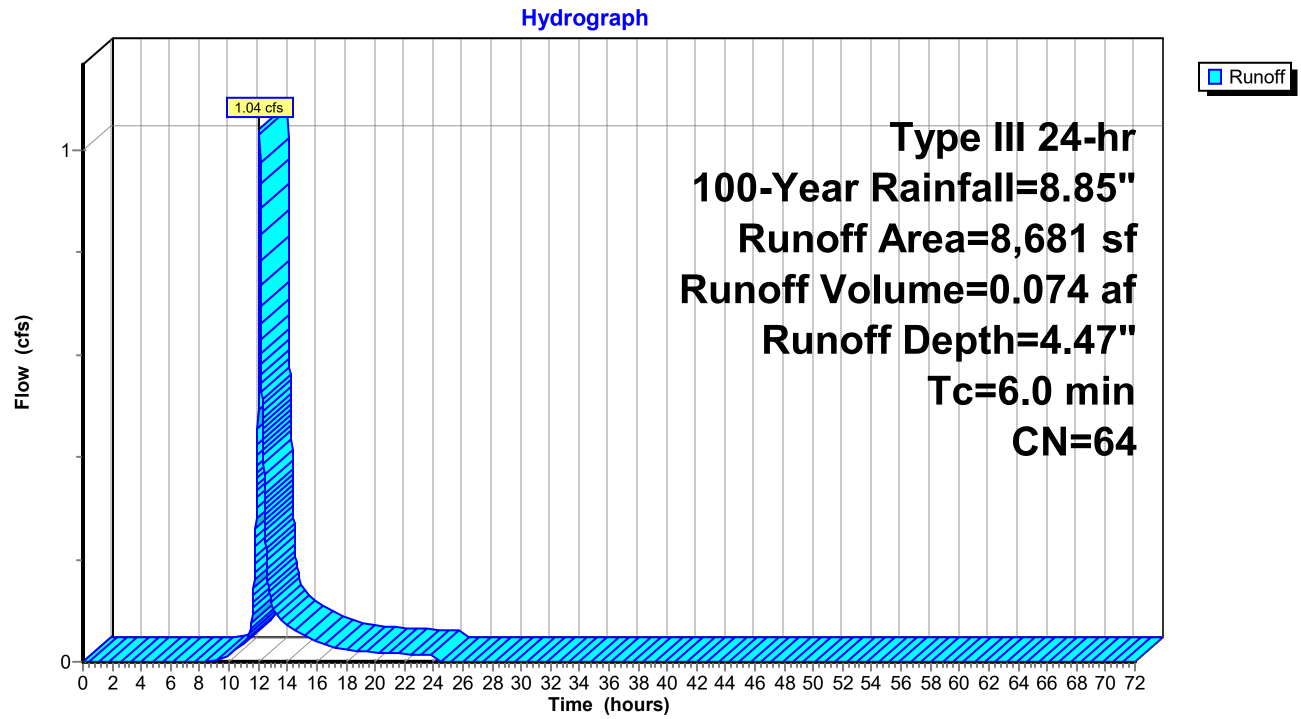
Runoff = 1.04 cfs @ 12.09 hrs, Volume= 0.074 af, Depth= 4.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.85"

	Area (sf)	CN	Description
	2,076	30	Brush, Good, HSG A
	3,179	49	50-75% Grass cover, Fair, HSG A
*	3,211	98	Gravel parking, HSG A
	215	98	Impervious Surface, HSG A
	8,681	64	Weighted Average
	5,255		60.53% Pervious Area
	3,426		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2

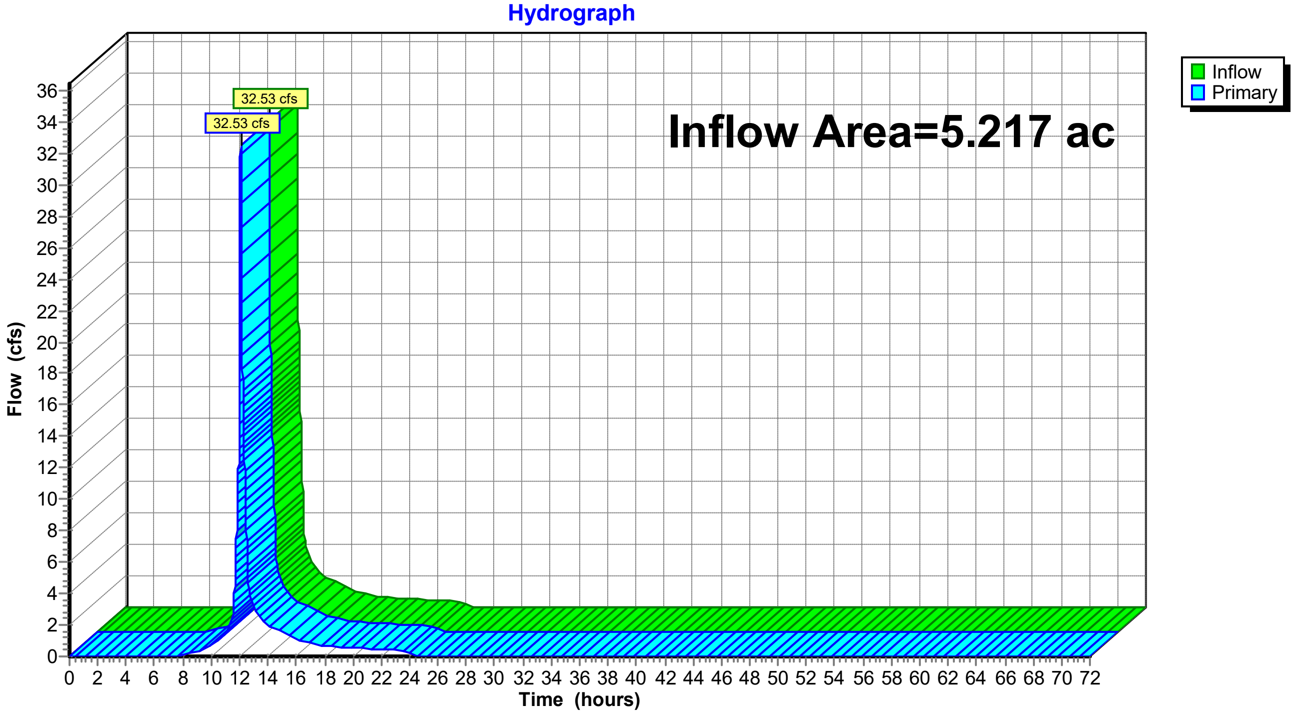


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area = 5.217 ac, 38.51% Impervious, Inflow Depth = 5.33" for 100-Year event
Inflow = 32.53 cfs @ 12.09 hrs, Volume= 2.315 af
Primary = 32.53 cfs @ 12.09 hrs, Volume= 2.315 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

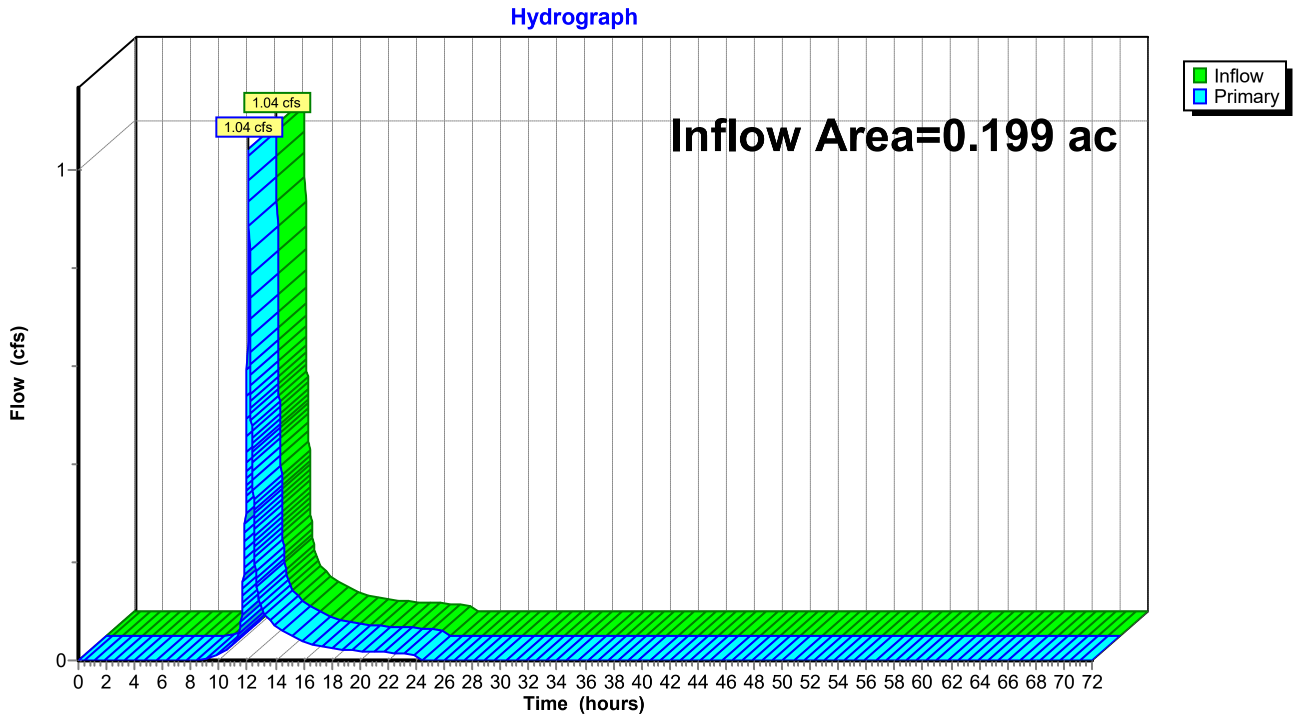


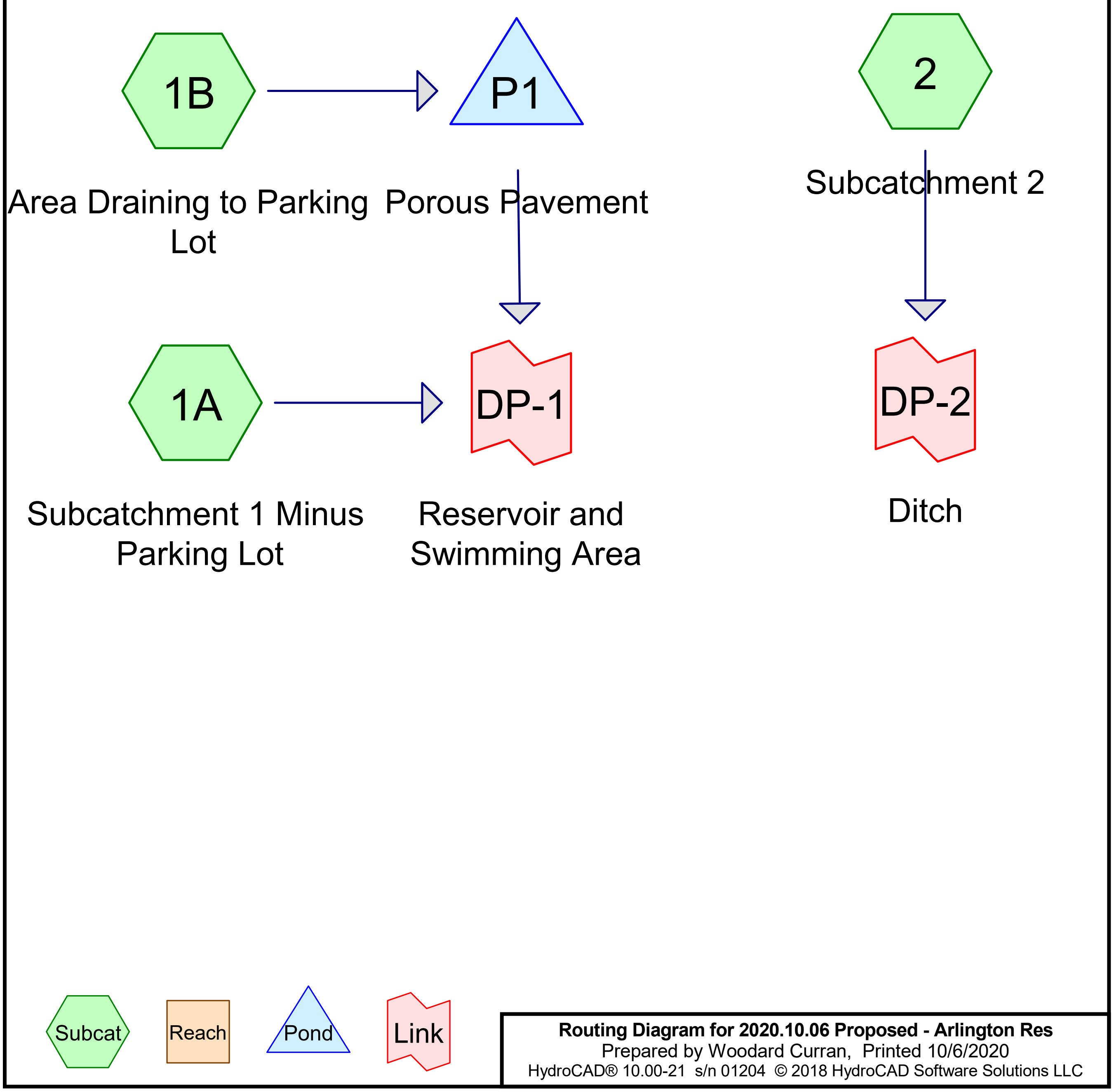
Summary for Link DP-2: Ditch

Inflow Area =	0.199 ac,	39.47% Impervious,	Inflow Depth = 4.47"	for 100-Year event	
Inflow =	1.04 cfs @	12.09 hrs,	Volume=	0.074 af	
Primary =	1.04 cfs @	12.09 hrs,	Volume=	0.074 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch





Routing Diagram for 2020.10.06 Proposed - Arlington Res
Prepared by Woodard Curran, Printed 10/6/2020
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.573	39	>75% Grass cover, Good, HSG A (1A, 1B, 2)
1.029	63	Beach Sand, HSG A (1A)
0.304	30	Brush, Good, HSG A (1A)
0.467	98	Impervious Surface, HSG A (1A, 1B)
0.184	39	Permeable Playground Surface, Good, HSG A (1A)
0.521	98	Porous Pavement, HSG A (1A, 1B)
0.138	96	Stone Dust, HSG A (1A)
1.200	98	Water Surface, HSG A (1A)
5.416	**68**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
5.416	HSG A	1A, 1B, 2
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
5.416		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatch Numbers
1.573	0.000	0.000	0.000	0.000	1.573	>75% Grass cover, Good	
1.029	0.000	0.000	0.000	0.000	1.029	Beach Sand	
0.304	0.000	0.000	0.000	0.000	0.304	Brush, Good	
0.467	0.000	0.000	0.000	0.000	0.467	Impervious Surface	
0.184	0.000	0.000	0.000	0.000	0.184	Permeable Playground Surface, Good	
0.521	0.000	0.000	0.000	0.000	0.521	Porous Pavement	
0.138	0.000	0.000	0.000	0.000	0.138	Stone Dust	
1.200	0.000	0.000	0.000	0.000	1.200	Water Surface	
5.416	**0.000**	**0.000**	**0.000**	**0.000**	**5.416**	**TOTAL AREA**	

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	P1	162.15	162.05	20.0	0.0050	0.013	12.0	0.0	0.0

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A: Subcatchment 1 Runoff Area=201,945 sf 36.57% Impervious Runoff Depth=0.43"
Tc=6.0 min CN=67 Runoff=1.65 cfs 0.166 af

Subcatchment 1B: Area Draining to Runoff Area=29,873 sf 71.84% Impervious Runoff Depth=1.07"
Tc=6.0 min CN=81 Runoff=0.84 cfs 0.061 af

Subcatchment 2: Subcatchment 2 Runoff Area=4,115 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=39 Runoff=0.00 cfs 0.000 af

Pond P1: Porous Pavement Peak Elev=161.40' Storage=0 cf Inflow=0.84 cfs 0.061 af
Discarded=0.84 cfs 0.061 af Primary=0.00 cfs 0.000 af Outflow=0.84 cfs 0.061 af

Link DP-1: Reservoir and Swimming Area Inflow=1.65 cfs 0.166 af
Primary=1.65 cfs 0.166 af

Link DP-2: Ditch Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 5.416 ac Runoff Volume = 0.227 af Average Runoff Depth = 0.50"
59.60% Pervious = 3.228 ac 40.40% Impervious = 2.188 ac

Summary for Subcatchment 1A: Subcatchment 1 Minus Parking Lot

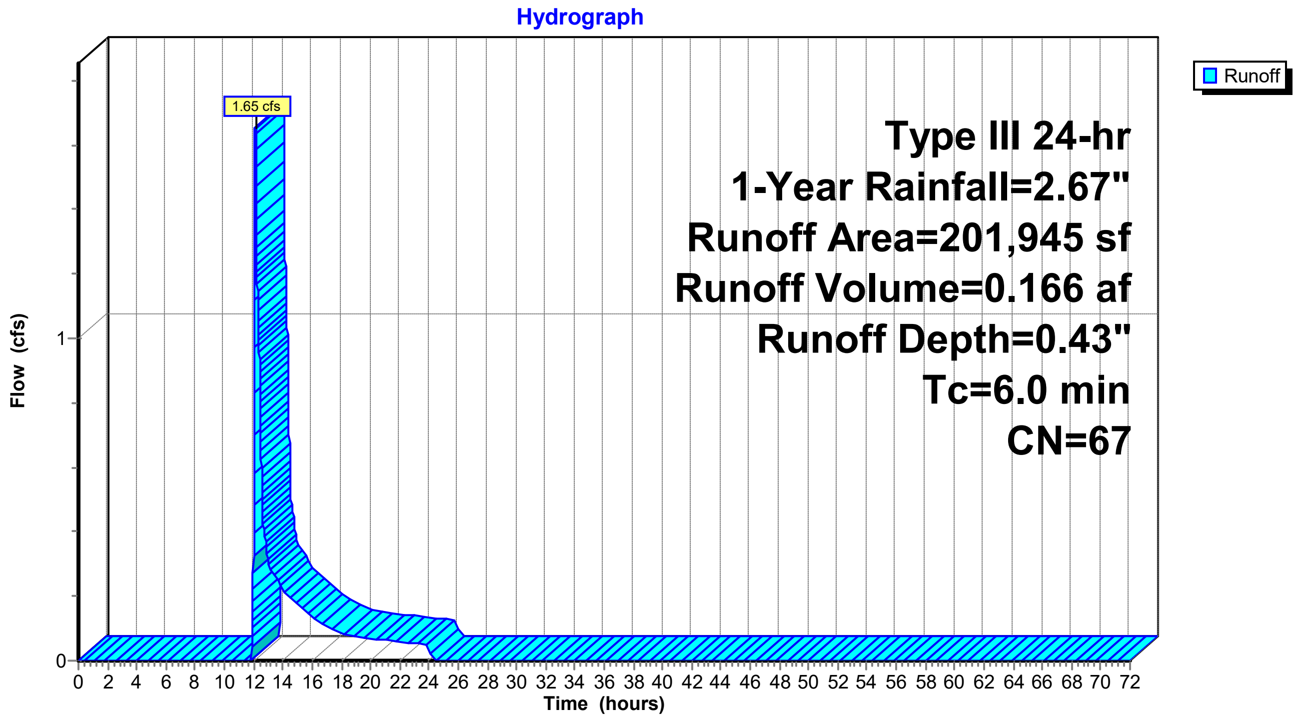
Runoff = 1.65 cfs @ 12.11 hrs, Volume= 0.166 af, Depth= 0.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.67"

	Area (sf)	CN	Description
	13,237	30	Brush, Good, HSG A
*	44,830	63	Beach Sand, HSG A
	56,001	39	>75% Grass cover, Good, HSG A
	19,764	98	Impervious Surface, HSG A
*	1,800	98	Porous Pavement, HSG A
	52,292	98	Water Surface, HSG A
*	6,010	96	Stone Dust, HSG A
*	8,011	39	Permeable Playground Surface, Good, HSG A
	201,945	67	Weighted Average
	128,089		63.43% Pervious Area
	73,856		36.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1A: Subcatchment 1 Minus Parking Lot



Summary for Subcatchment 1B: Area Draining to Parking Lot

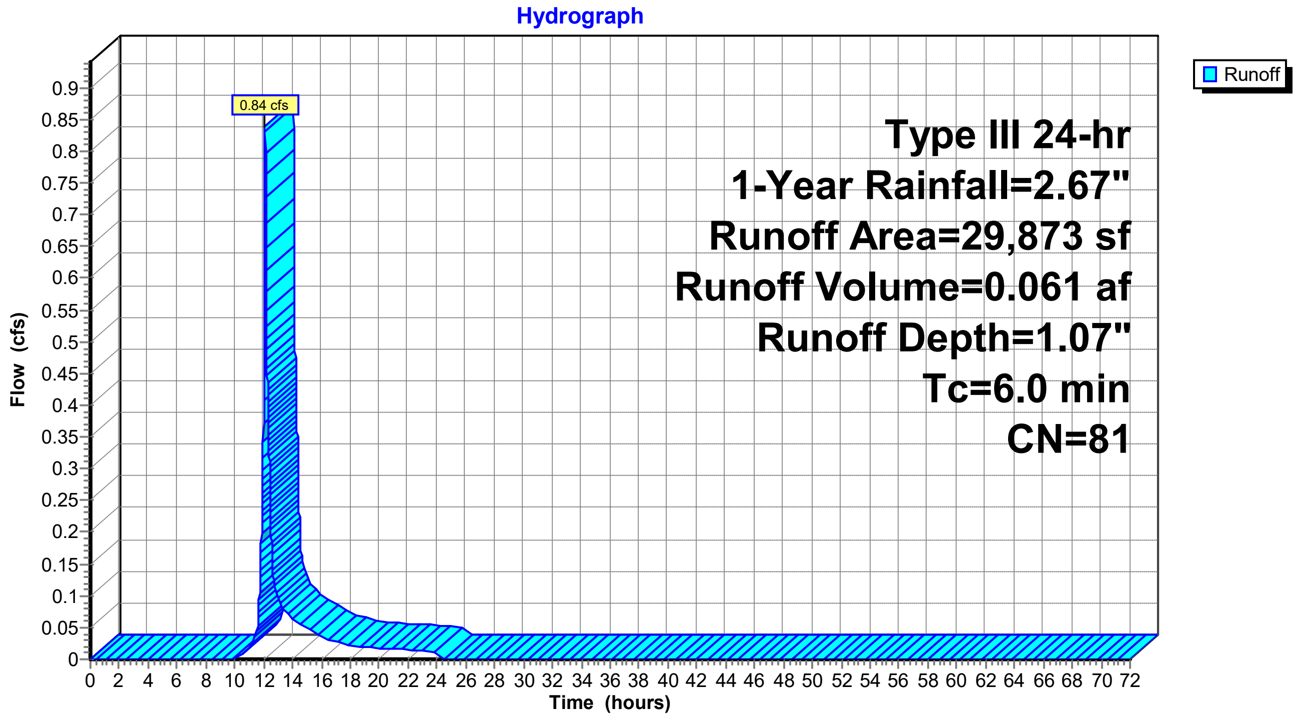
Runoff = 0.84 cfs @ 12.09 hrs, Volume= 0.061 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.67"

	Area (sf)	CN	Description
	8,411	39	>75% Grass cover, Good, HSG A
	574	98	Impervious Surface, HSG A
*	20,888	98	Porous Pavement, HSG A
	29,873	81	Weighted Average
	8,411		28.16% Pervious Area
	21,462		71.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1B: Area Draining to Parking Lot



Summary for Subcatchment 2: Subcatchment 2

[45] Hint: Runoff=Zero

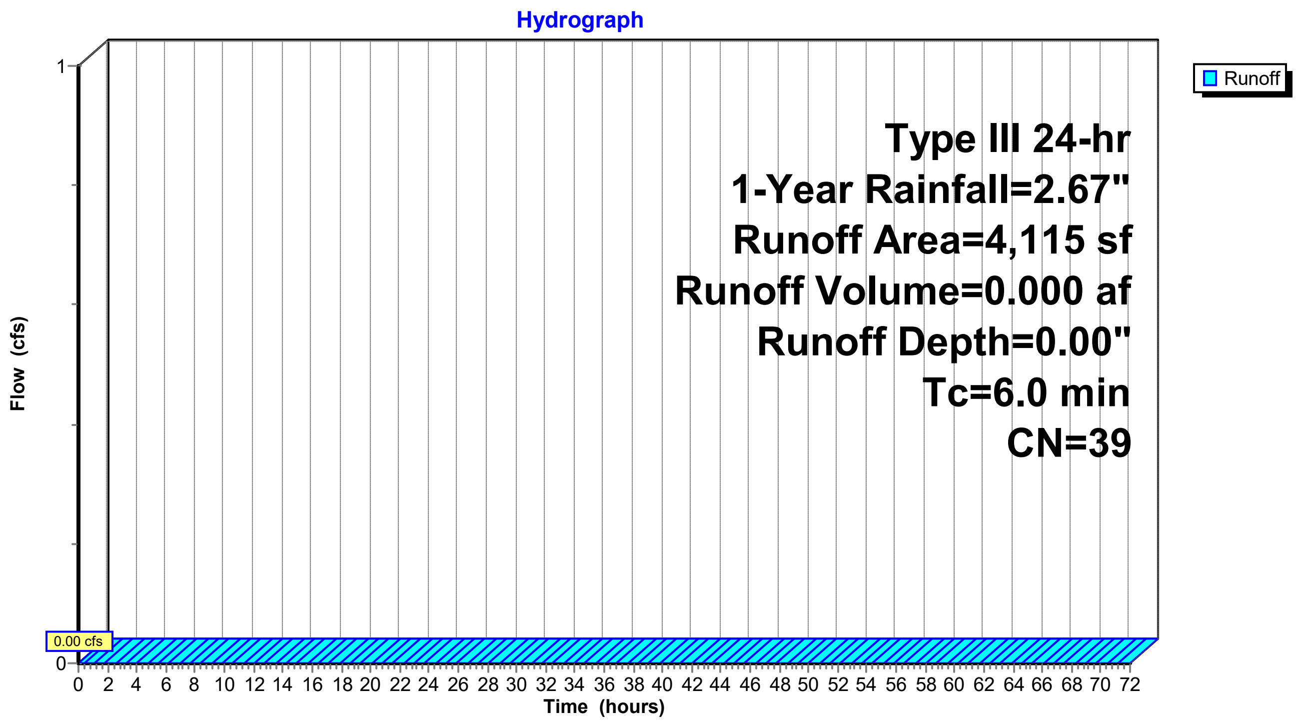
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.67"

Area (sf)	CN	Description
4,115	39	>75% Grass cover, Good, HSG A
4,115		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2



Summary for Pond P1: Porous Pavement

Inflow Area = 0.686 ac, 71.84% Impervious, Inflow Depth = 1.07" for 1-Year event
Inflow = 0.84 cfs @ 12.09 hrs, Volume= 0.061 af
Outflow = 0.84 cfs @ 12.09 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.84 cfs @ 12.09 hrs, Volume= 0.061 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 161.40' @ 12.09 hrs Surf.Area= 21,411 sf Storage= 0 cf
Flood Elev= 164.00' Surf.Area= 42,822 sf Storage= 11,383 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (849.0 - 849.0)

Volume	Invert	Avail.Storage	Storage Description
#1	161.40'	7,099 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 17,771 cf Overall - 23 cf Embedded = 17,749 cf x 40.0% Voids
#2	162.23'	4,261 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#3	161.73'	23 cf	**4.0" Round Pipe Storage** Inside #1 L= 258.0'
		11,383 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
161.40	21,411	0	0
162.23	21,411	17,771	17,771

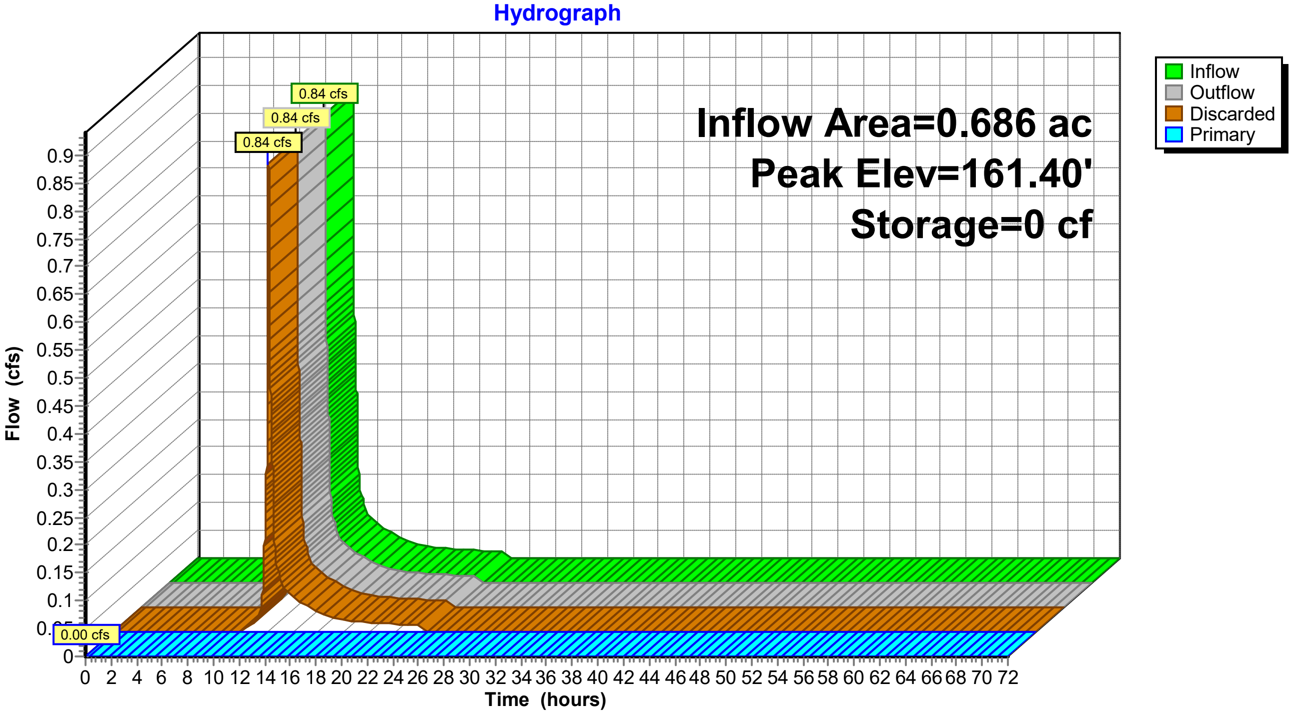
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
162.23	21,411	0.0	0	0
162.48	21,411	40.0	2,141	2,141
162.81	21,411	30.0	2,120	4,261

Device	Routing	Invert	Outlet Devices
#1	Primary	162.15'	**12.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 162.15' / 162.05' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	161.73'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	161.40'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.19 cfs @ 12.09 hrs HW=161.40' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.40' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond P1: Porous Pavement

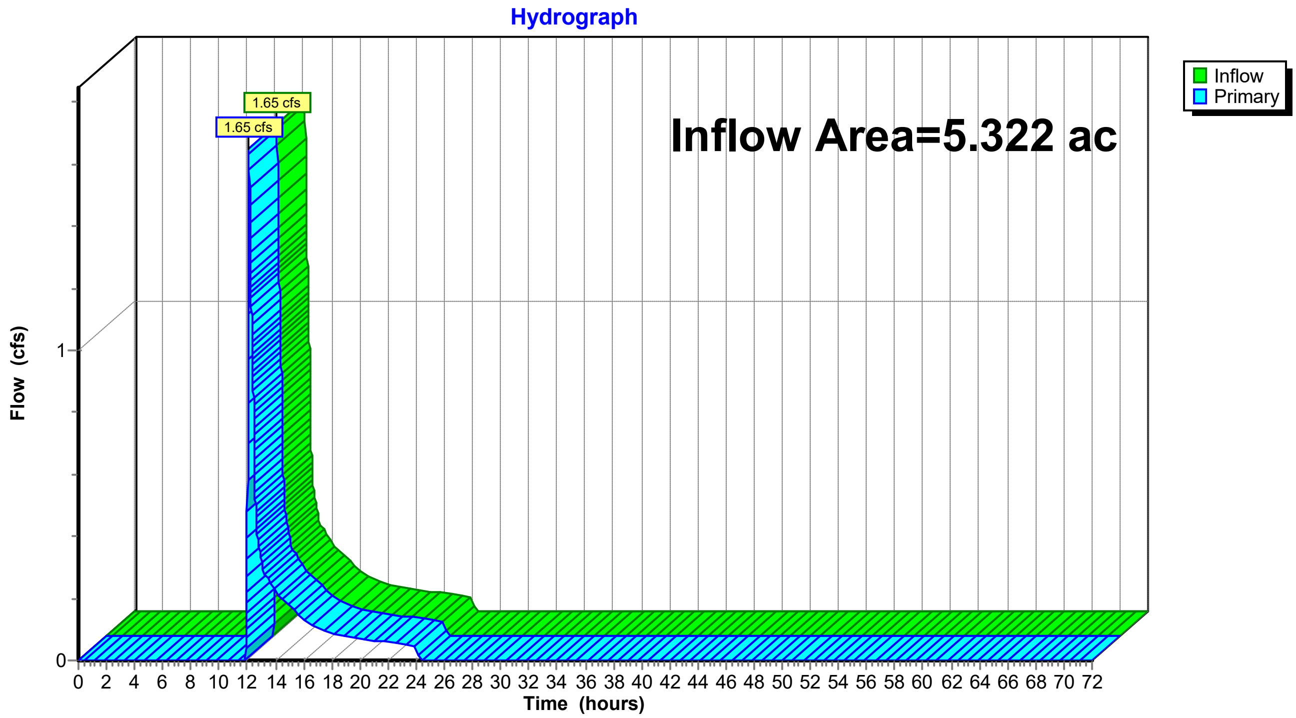


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area = 5.322 ac, 41.12% Impervious, Inflow Depth = 0.37" for 1-Year event
Inflow = 1.65 cfs @ 12.11 hrs, Volume= 0.166 af
Primary = 1.65 cfs @ 12.11 hrs, Volume= 0.166 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

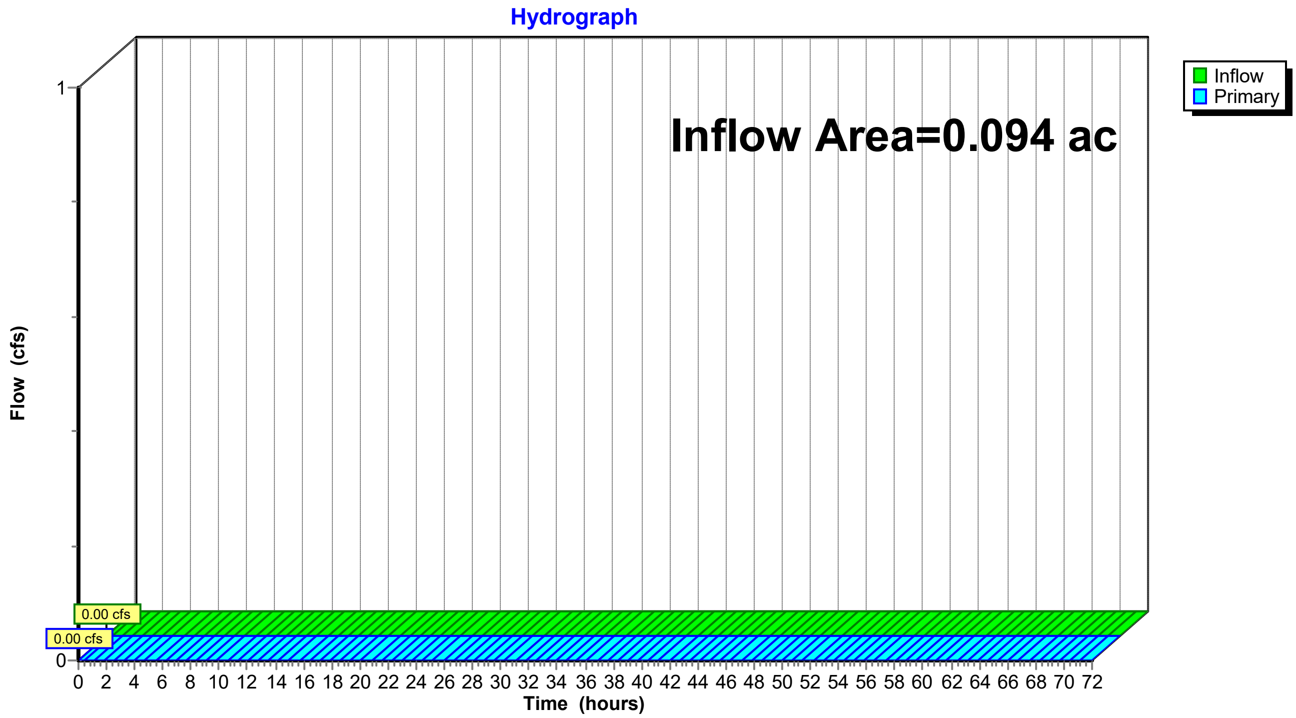


Summary for Link DP-2: Ditch

Inflow Area =	0.094 ac,	0.00% Impervious,	Inflow Depth = 0.00"	for 1-Year event
Inflow =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A: Subcatchment 1 Runoff Area=201,945 sf 36.57% Impervious Runoff Depth=0.69"
Tc=6.0 min CN=67 Runoff=3.15 cfs 0.267 af

Subcatchment 1B: Area Draining to Runoff Area=29,873 sf 71.84% Impervious Runoff Depth=1.48"
Tc=6.0 min CN=81 Runoff=1.18 cfs 0.084 af

Subcatchment 2: Subcatchment 2 Runoff Area=4,115 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=39 Runoff=0.00 cfs 0.000 af

Pond P1: Porous Pavement Peak Elev=161.40' Storage=1 cf Inflow=1.18 cfs 0.084 af
Discarded=1.17 cfs 0.084 af Primary=0.00 cfs 0.000 af Outflow=1.17 cfs 0.084 af

Link DP-1: Reservoir and Swimming Area Inflow=3.15 cfs 0.267 af
Primary=3.15 cfs 0.267 af

Link DP-2: Ditch Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 5.416 ac Runoff Volume = 0.352 af Average Runoff Depth = 0.78"
59.60% Pervious = 3.228 ac 40.40% Impervious = 2.188 ac

Summary for Subcatchment 1A: Subcatchment 1 Minus Parking Lot

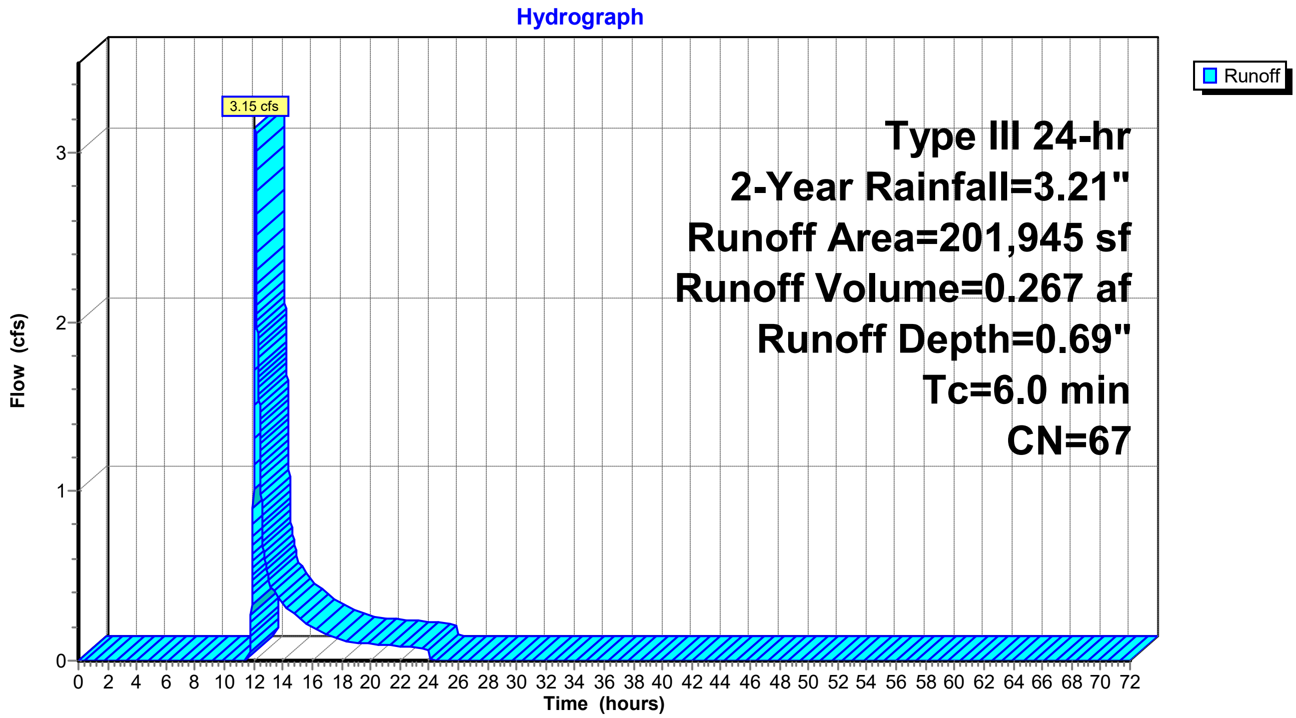
Runoff = 3.15 cfs @ 12.10 hrs, Volume= 0.267 af, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.21"

	Area (sf)	CN	Description
	13,237	30	Brush, Good, HSG A
*	44,830	63	Beach Sand, HSG A
	56,001	39	>75% Grass cover, Good, HSG A
	19,764	98	Impervious Surface, HSG A
*	1,800	98	Porous Pavement, HSG A
	52,292	98	Water Surface, HSG A
*	6,010	96	Stone Dust, HSG A
*	8,011	39	Permeable Playground Surface, Good, HSG A
	201,945	67	Weighted Average
	128,089		63.43% Pervious Area
	73,856		36.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1A: Subcatchment 1 Minus Parking Lot



Summary for Subcatchment 1B: Area Draining to Parking Lot

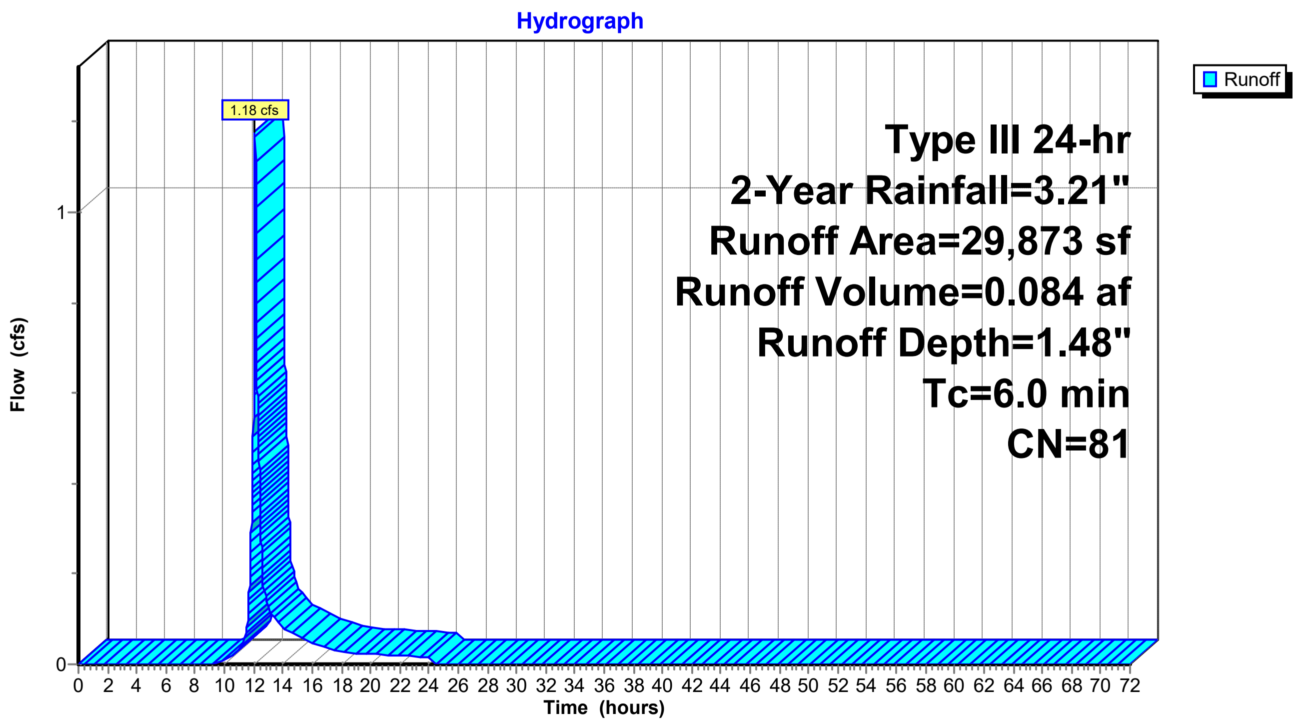
Runoff = 1.18 cfs @ 12.09 hrs, Volume= 0.084 af, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.21"

	Area (sf)	CN	Description
	8,411	39	>75% Grass cover, Good, HSG A
	574	98	Impervious Surface, HSG A
*	20,888	98	Porous Pavement, HSG A
	29,873	81	Weighted Average
	8,411		28.16% Pervious Area
	21,462		71.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1B: Area Draining to Parking Lot



Summary for Subcatchment 2: Subcatchment 2

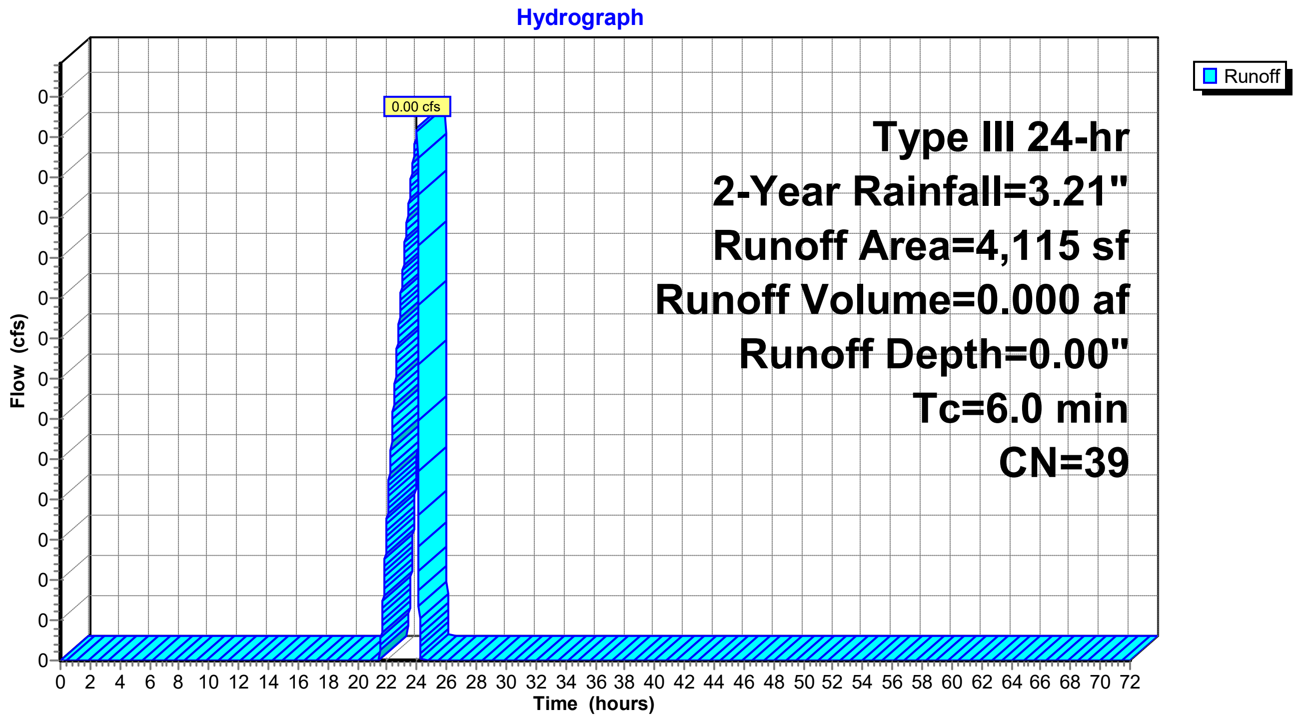
Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.21"

Area (sf)	CN	Description
4,115	39	>75% Grass cover, Good, HSG A
4,115		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2



Summary for Pond P1: Porous Pavement

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=547)

Inflow Area = 0.686 ac, 71.84% Impervious, Inflow Depth = 1.48" for 2-Year event
Inflow = 1.18 cfs @ 12.09 hrs, Volume= 0.084 af
Outflow = 1.17 cfs @ 12.10 hrs, Volume= 0.084 af, Atten= 0%, Lag= 0.4 min
Discarded = 1.17 cfs @ 12.10 hrs, Volume= 0.084 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 161.40' @ 12.10 hrs Surf.Area= 21,411 sf Storage= 1 cf
Flood Elev= 164.00' Surf.Area= 42,822 sf Storage= 11,383 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (839.4 - 839.4)

Volume	Invert	Avail.Storage	Storage Description
#1	161.40'	7,099 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 17,771 cf Overall - 23 cf Embedded = 17,749 cf x 40.0% Voids
#2	162.23'	4,261 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#3	161.73'	23 cf	**4.0" Round Pipe Storage** Inside #1 L= 258.0'
		11,383 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
161.40	21,411	0	0
162.23	21,411	17,771	17,771

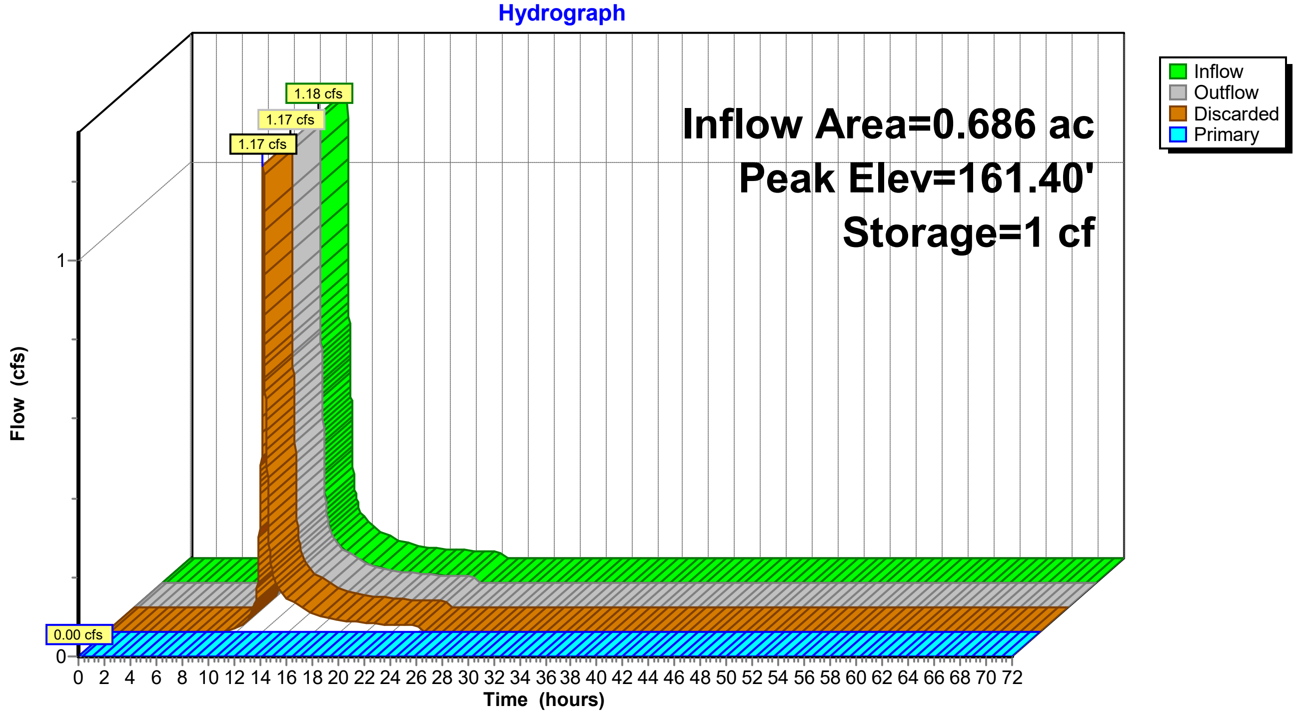
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
162.23	21,411	0.0	0	0
162.48	21,411	40.0	2,141	2,141
162.81	21,411	30.0	2,120	4,261

Device	Routing	Invert	Outlet Devices
#1	Primary	162.15'	**12.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 162.15' / 162.05' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	161.73'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	161.40'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.19 cfs @ 12.10 hrs HW=161.40' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.40' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond P1: Porous Pavement

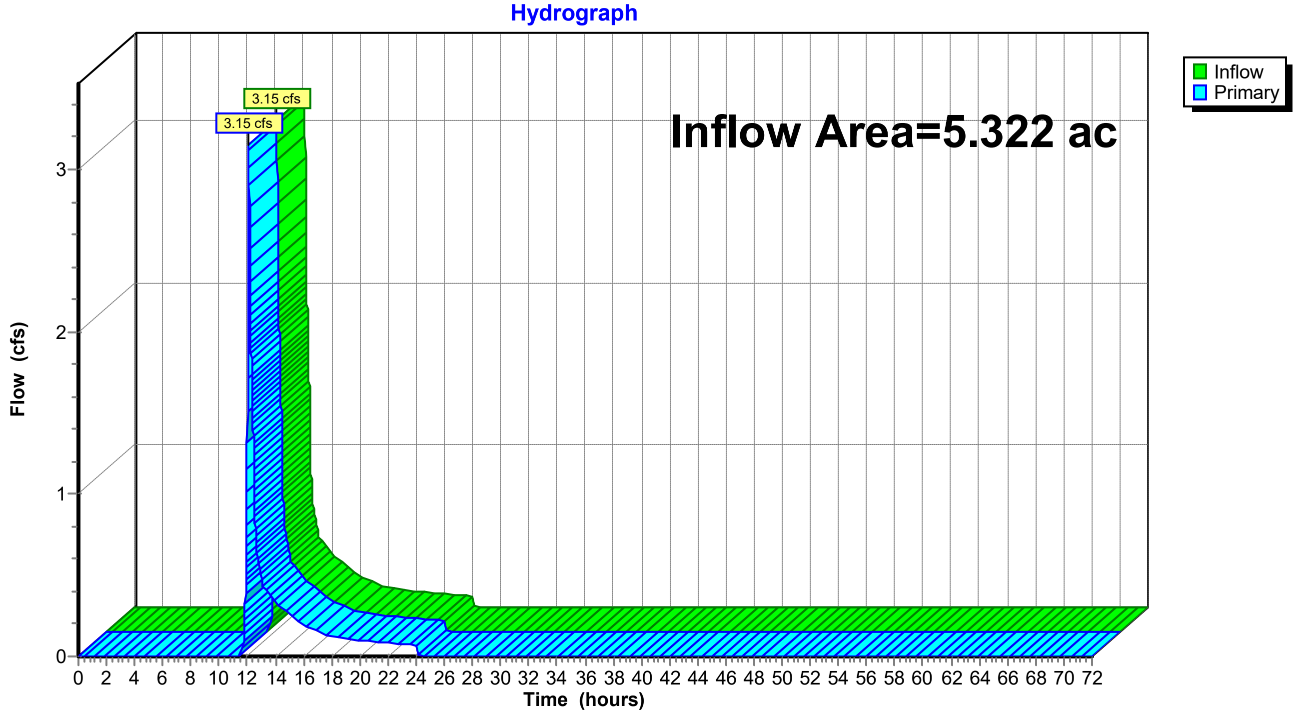


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.322 ac, 41.12% Impervious,	Inflow Depth = 0.60"	for 2-Year event	
Inflow =	3.15 cfs @ 12.10 hrs,	Volume=	0.267 af	
Primary =	3.15 cfs @ 12.10 hrs,	Volume=	0.267 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

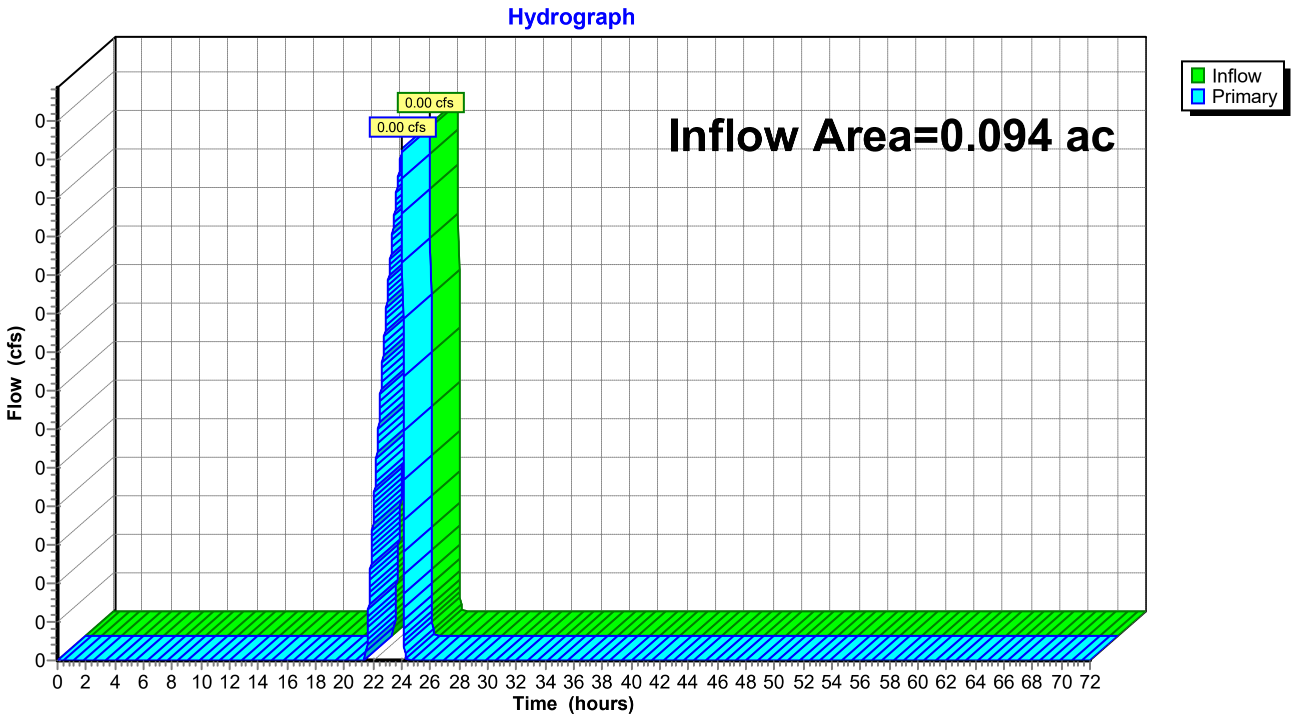


Summary for Link DP-2: Ditch

Inflow Area =	0.094 ac,	0.00% Impervious, Inflow Depth = 0.00"	for 2-Year event
Inflow =	0.00 cfs @	24.01 hrs, Volume=	0.000 af
Primary =	0.00 cfs @	24.01 hrs, Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A: Subcatchment 1 Runoff Area=201,945 sf 36.57% Impervious Runoff Depth=1.71"
Tc=6.0 min CN=67 Runoff=8.92 cfs 0.659 af

Subcatchment 1B: Area Draining to Runoff Area=29,873 sf 71.84% Impervious Runoff Depth=2.86"
Tc=6.0 min CN=81 Runoff=2.30 cfs 0.164 af

Subcatchment 2: Subcatchment 2 Runoff Area=4,115 sf 0.00% Impervious Runoff Depth=0.17"
Tc=6.0 min CN=39 Runoff=0.00 cfs 0.001 af

Pond P1: Porous Pavement Peak Elev=161.46' Storage=515 cf Inflow=2.30 cfs 0.164 af
Discarded=1.19 cfs 0.164 af Primary=0.00 cfs 0.000 af Outflow=1.19 cfs 0.164 af

Link DP-1: Reservoir and Swimming Area Inflow=8.92 cfs 0.659 af
Primary=8.92 cfs 0.659 af

Link DP-2: Ditch Inflow=0.00 cfs 0.001 af
Primary=0.00 cfs 0.001 af

Total Runoff Area = 5.416 ac Runoff Volume = 0.824 af Average Runoff Depth = 1.83"
59.60% Pervious = 3.228 ac 40.40% Impervious = 2.188 ac

Summary for Subcatchment 1A: Subcatchment 1 Minus Parking Lot

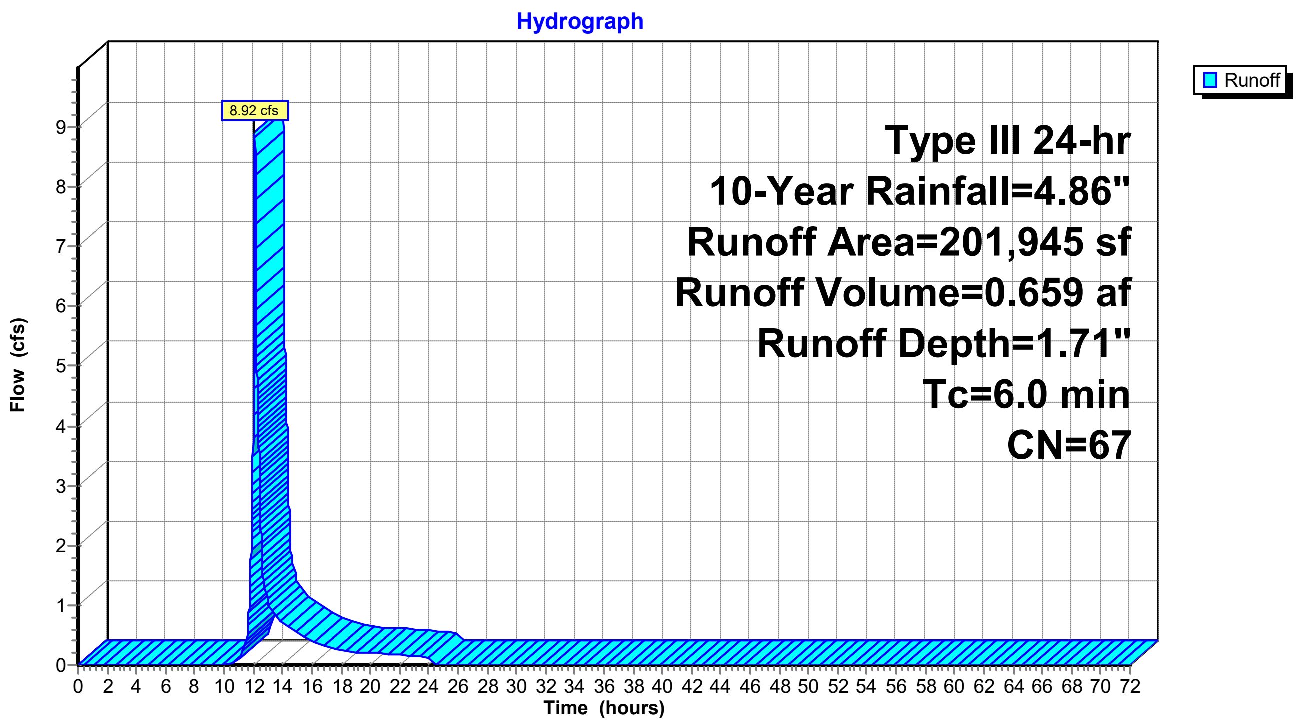
Runoff = 8.92 cfs @ 12.09 hrs, Volume= 0.659 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
	13,237	30	Brush, Good, HSG A
*	44,830	63	Beach Sand, HSG A
	56,001	39	>75% Grass cover, Good, HSG A
	19,764	98	Impervious Surface, HSG A
*	1,800	98	Porous Pavement, HSG A
	52,292	98	Water Surface, HSG A
*	6,010	96	Stone Dust, HSG A
*	8,011	39	Permeable Playground Surface, Good, HSG A
	201,945	67	Weighted Average
	128,089		63.43% Pervious Area
	73,856		36.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1A: Subcatchment 1 Minus Parking Lot



Summary for Subcatchment 1B: Area Draining to Parking Lot

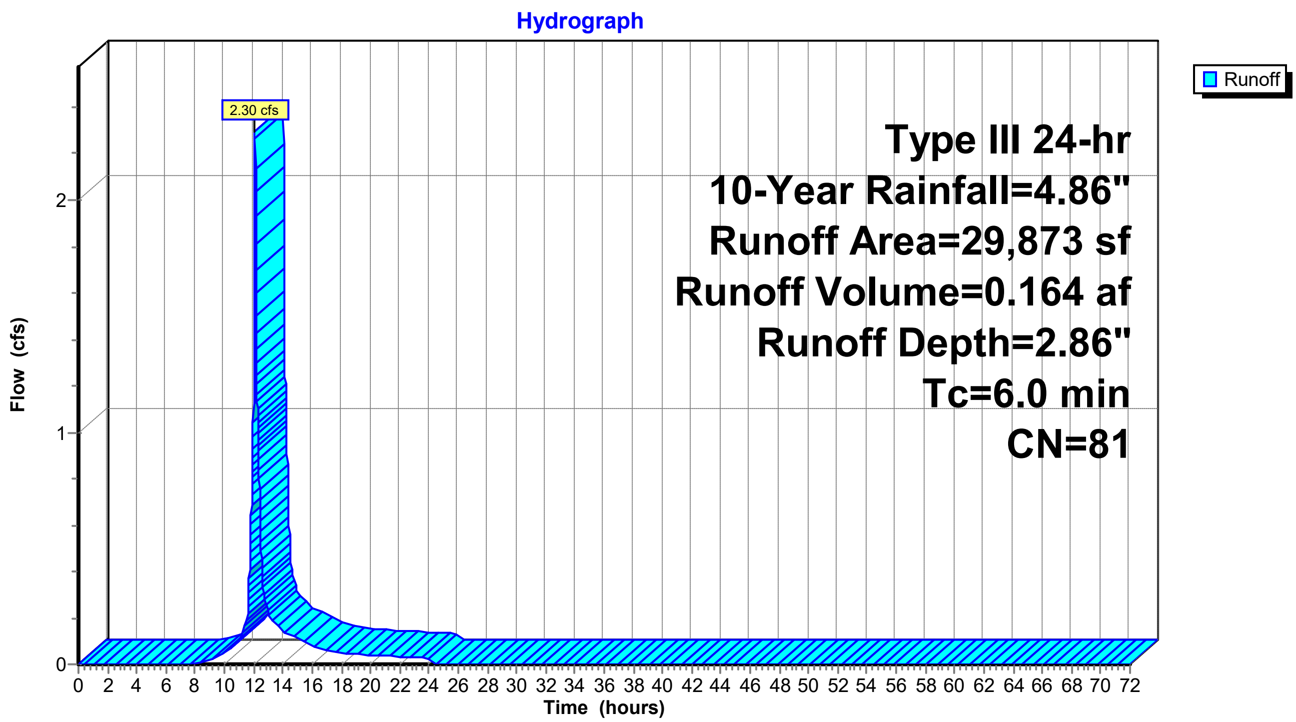
Runoff = 2.30 cfs @ 12.09 hrs, Volume= 0.164 af, Depth= 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
	8,411	39	>75% Grass cover, Good, HSG A
	574	98	Impervious Surface, HSG A
*	20,888	98	Porous Pavement, HSG A
	29,873	81	Weighted Average
	8,411		28.16% Pervious Area
	21,462		71.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1B: Area Draining to Parking Lot



Summary for Subcatchment 2: Subcatchment 2

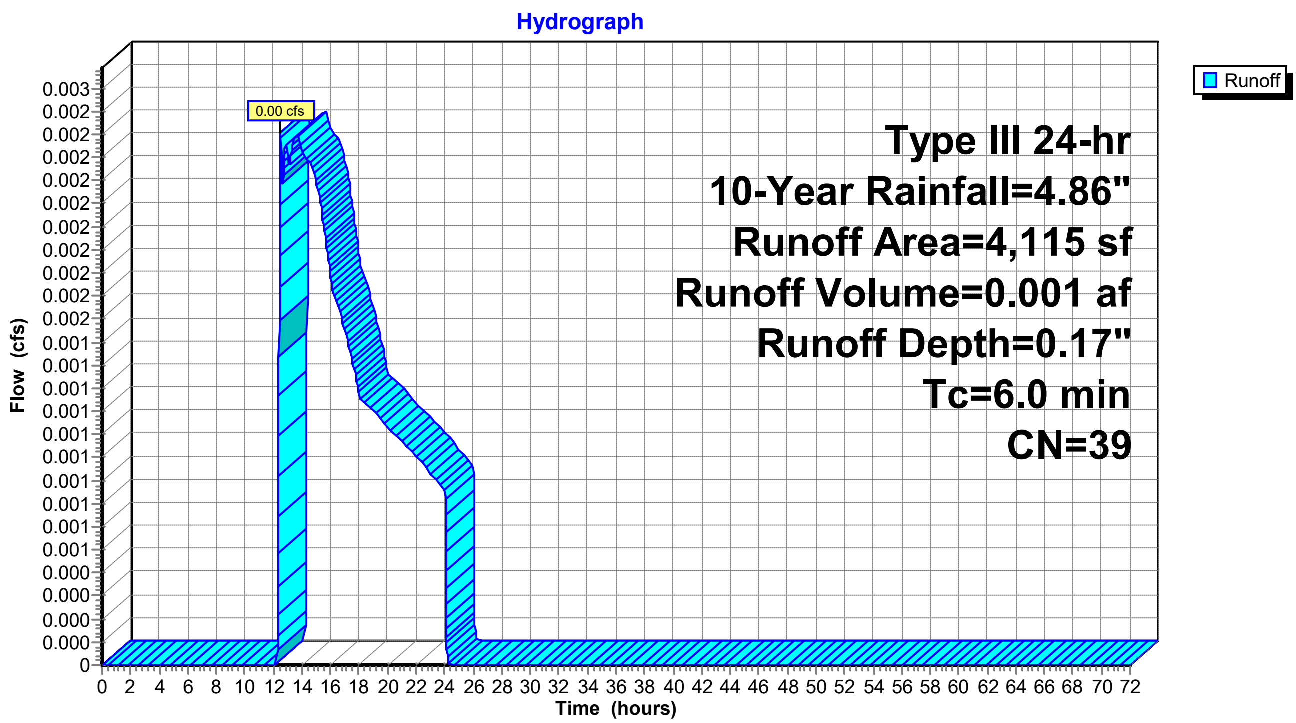
Runoff = 0.00 cfs @ 12.51 hrs, Volume= 0.001 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.86"

Area (sf)	CN	Description
4,115	39	>75% Grass cover, Good, HSG A
4,115		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2



Summary for Pond P1: Porous Pavement

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=576)

Inflow Area = 0.686 ac, 71.84% Impervious, Inflow Depth = 2.86" for 10-Year event
Inflow = 2.30 cfs @ 12.09 hrs, Volume= 0.164 af
Outflow = 1.19 cfs @ 12.09 hrs, Volume= 0.164 af, Atten= 48%, Lag= 0.1 min
Discarded = 1.19 cfs @ 12.09 hrs, Volume= 0.164 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 161.46' @ 12.23 hrs Surf.Area= 21,411 sf Storage= 515 cf
Flood Elev= 164.00' Surf.Area= 42,822 sf Storage= 11,383 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.6 min (821.9 - 820.3)

Volume	Invert	Avail.Storage	Storage Description
#1	161.40'	7,099 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 17,771 cf Overall - 23 cf Embedded = 17,749 cf x 40.0% Voids
#2	162.23'	4,261 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#3	161.73'	23 cf	**4.0" Round Pipe Storage** Inside #1 L= 258.0'
		11,383 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
161.40	21,411	0	0
162.23	21,411	17,771	17,771

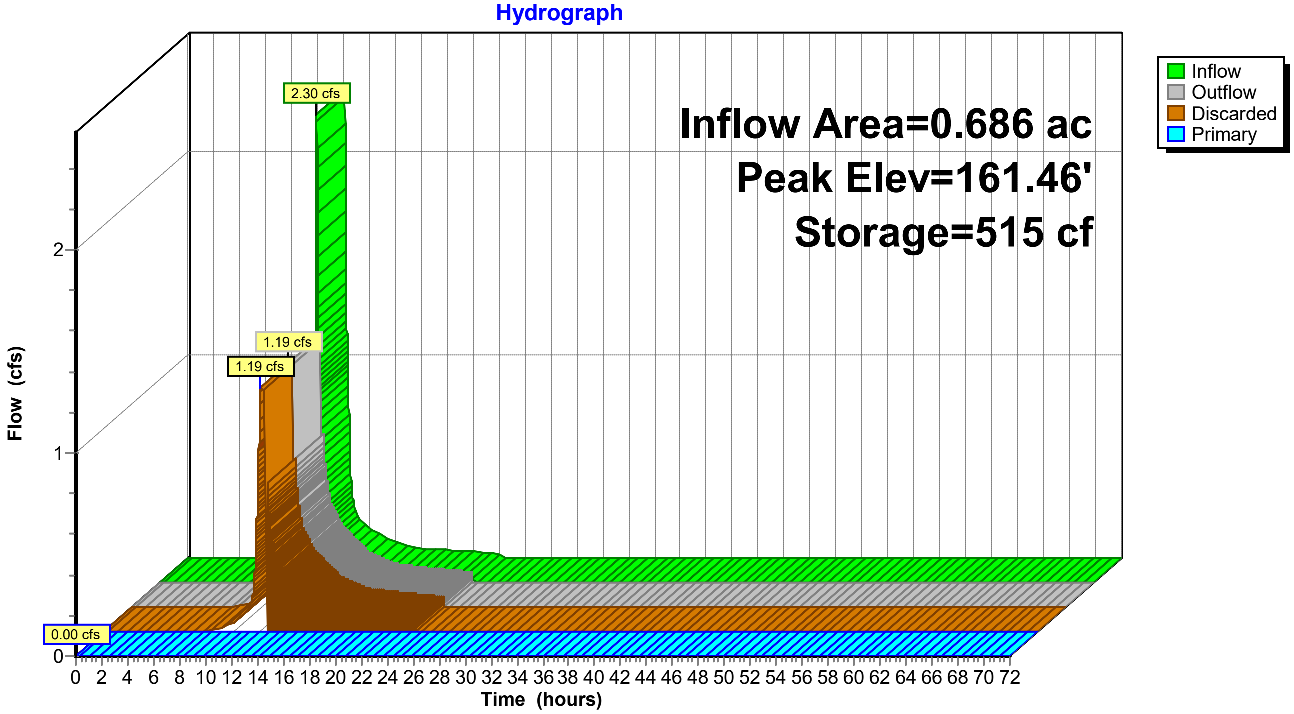
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
162.23	21,411	0.0	0	0
162.48	21,411	40.0	2,141	2,141
162.81	21,411	30.0	2,120	4,261

Device	Routing	Invert	Outlet Devices
#1	Primary	162.15'	**12.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 162.15' / 162.05' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	161.73'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	161.40'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.19 cfs @ 12.09 hrs HW=161.43' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.40' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond P1: Porous Pavement

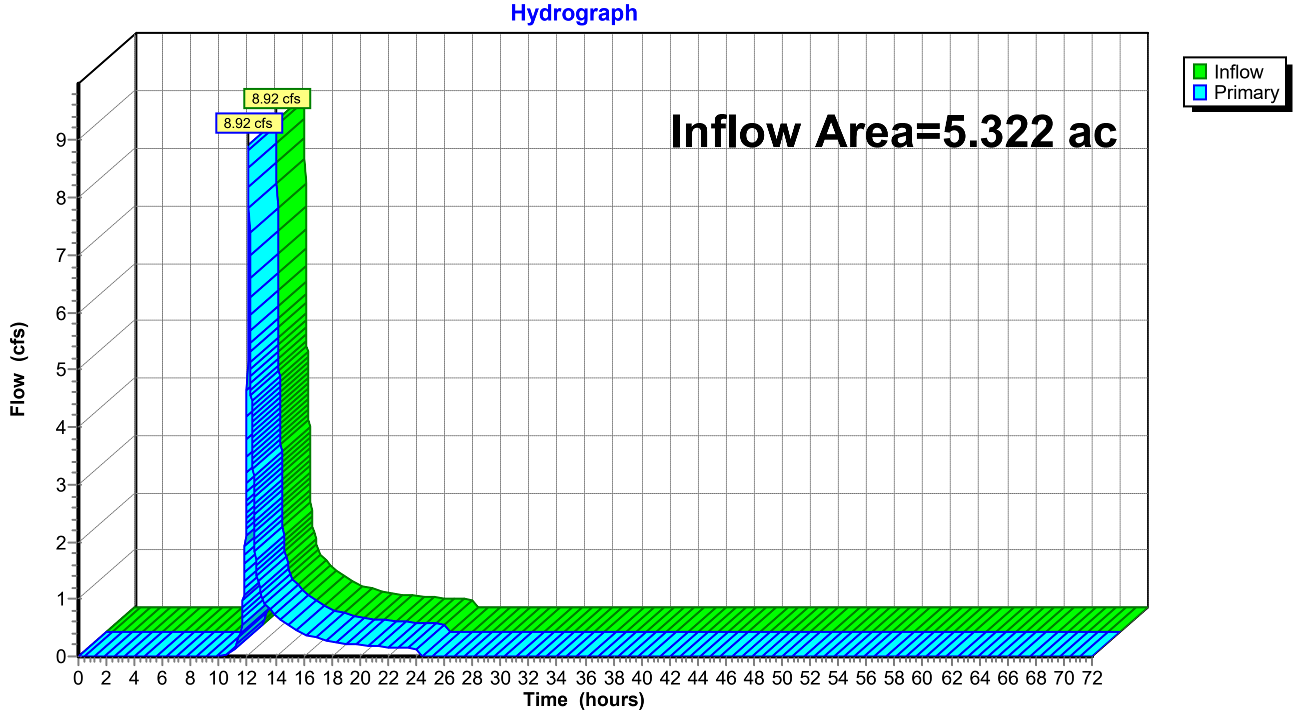


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.322 ac,	41.12% Impervious,	Inflow Depth = 1.49"	for 10-Year event	
Inflow =	8.92 cfs @	12.09 hrs,	Volume=	0.659 af	
Primary =	8.92 cfs @	12.09 hrs,	Volume=	0.659 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

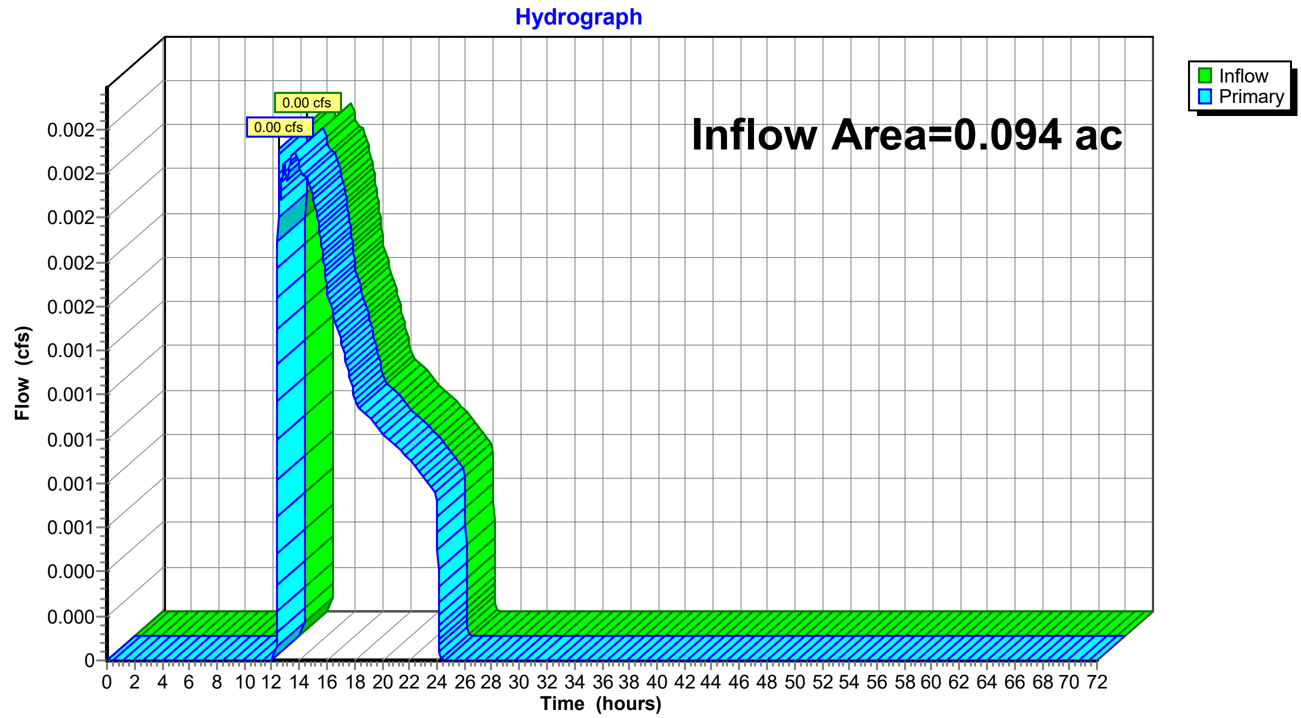


Summary for Link DP-2: Ditch

Inflow Area = 0.094 ac, 0.00% Impervious, Inflow Depth = 0.17" for 10-Year event
Inflow = 0.00 cfs @ 12.51 hrs, Volume= 0.001 af
Primary = 0.00 cfs @ 12.51 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A: Subcatchment 1 Runoff Area=201,945 sf 36.57% Impervious Runoff Depth=2.66"
Tc=6.0 min CN=67 Runoff=14.29 cfs 1.027 af

Subcatchment 1B: Area Draining to Runoff Area=29,873 sf 71.84% Impervious Runoff Depth=4.04"
Tc=6.0 min CN=81 Runoff=3.22 cfs 0.231 af

Subcatchment 2: Subcatchment 2 Runoff Area=4,115 sf 0.00% Impervious Runoff Depth=0.50"
Tc=6.0 min CN=39 Runoff=0.02 cfs 0.004 af

Pond P1: Porous Pavement Peak Elev=161.55' Storage=1,280 cf Inflow=3.22 cfs 0.231 af
Discarded=1.19 cfs 0.231 af Primary=0.00 cfs 0.000 af Outflow=1.19 cfs 0.231 af

Link DP-1: Reservoir and Swimming Area Inflow=14.29 cfs 1.027 af
Primary=14.29 cfs 1.027 af

Link DP-2: Ditch Inflow=0.02 cfs 0.004 af
Primary=0.02 cfs 0.004 af

Total Runoff Area = 5.416 ac Runoff Volume = 1.262 af Average Runoff Depth = 2.80"
59.60% Pervious = 3.228 ac 40.40% Impervious = 2.188 ac

Summary for Subcatchment 1A: Subcatchment 1 Minus Parking Lot

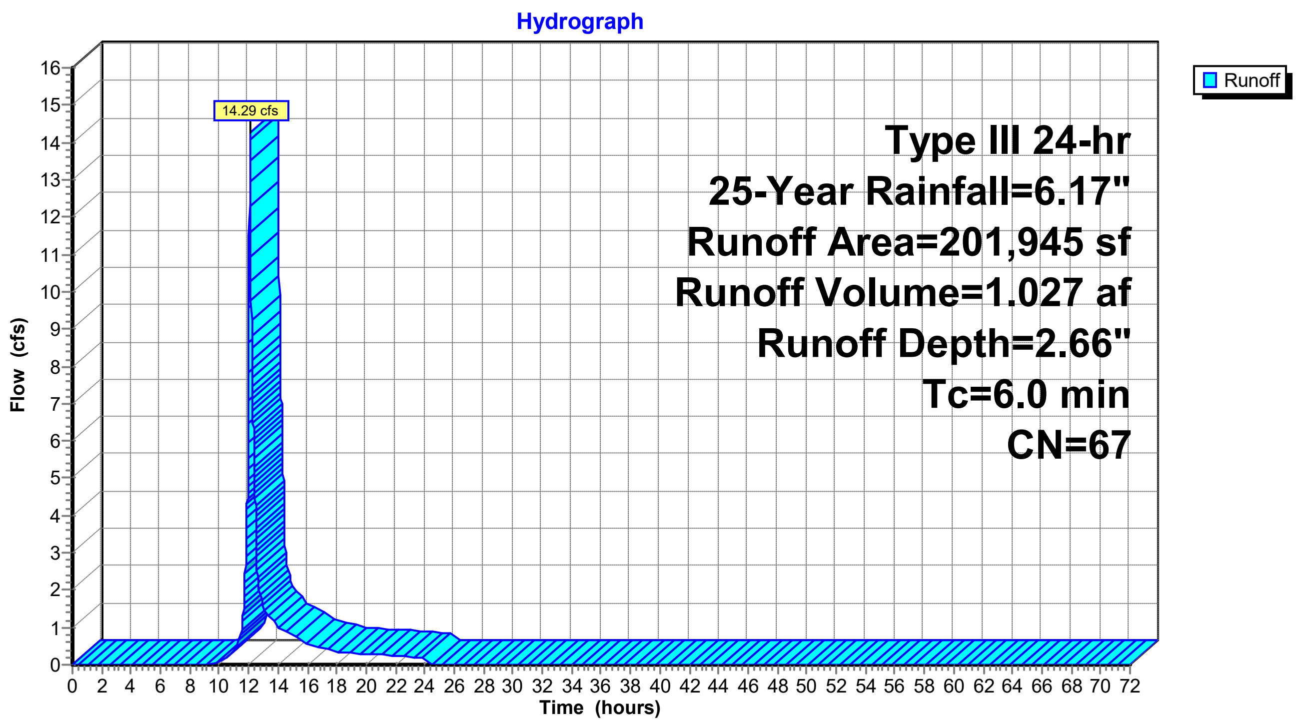
Runoff = 14.29 cfs @ 12.09 hrs, Volume= 1.027 af, Depth= 2.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.17"

	Area (sf)	CN	Description
	13,237	30	Brush, Good, HSG A
*	44,830	63	Beach Sand, HSG A
	56,001	39	>75% Grass cover, Good, HSG A
	19,764	98	Impervious Surface, HSG A
*	1,800	98	Porous Pavement, HSG A
	52,292	98	Water Surface, HSG A
*	6,010	96	Stone Dust, HSG A
*	8,011	39	Permeable Playground Surface, Good, HSG A
	201,945	67	Weighted Average
	128,089		63.43% Pervious Area
	73,856		36.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1A: Subcatchment 1 Minus Parking Lot



Summary for Subcatchment 1B: Area Draining to Parking Lot

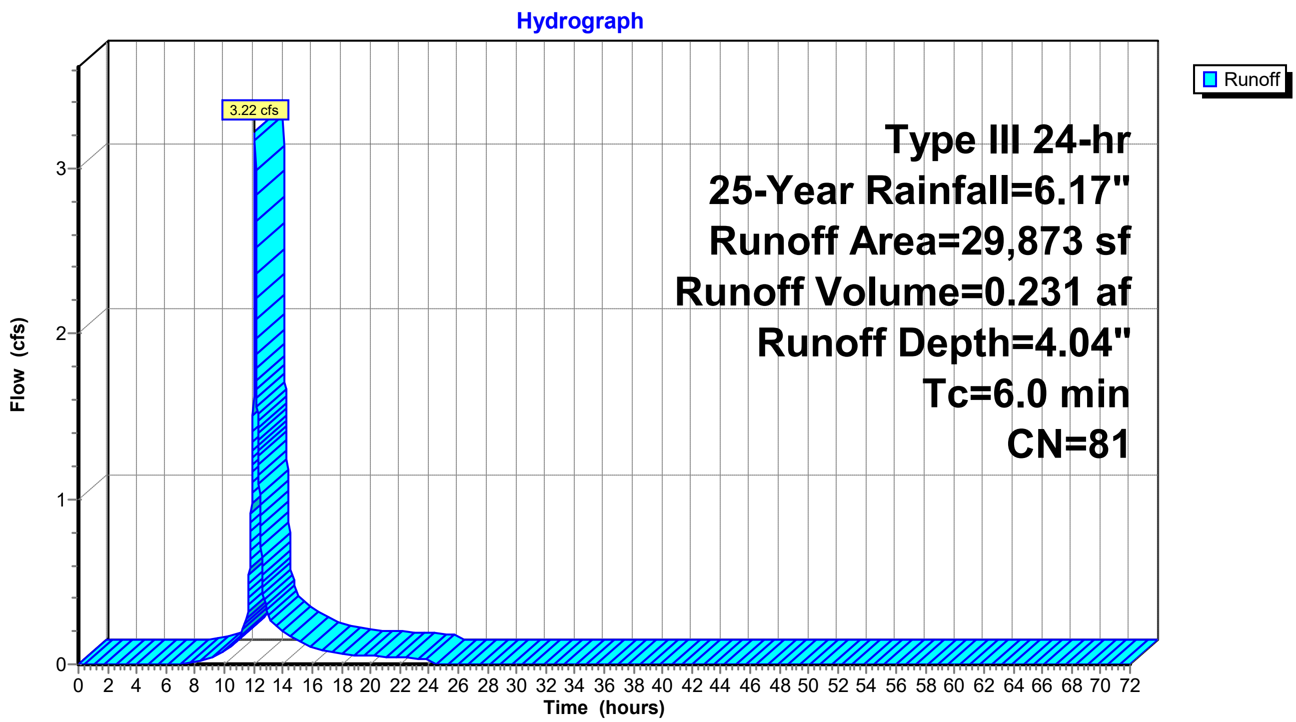
Runoff = 3.22 cfs @ 12.09 hrs, Volume= 0.231 af, Depth= 4.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.17"

	Area (sf)	CN	Description
	8,411	39	>75% Grass cover, Good, HSG A
	574	98	Impervious Surface, HSG A
*	20,888	98	Porous Pavement, HSG A
	29,873	81	Weighted Average
	8,411		28.16% Pervious Area
	21,462		71.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1B: Area Draining to Parking Lot



Summary for Subcatchment 2: Subcatchment 2

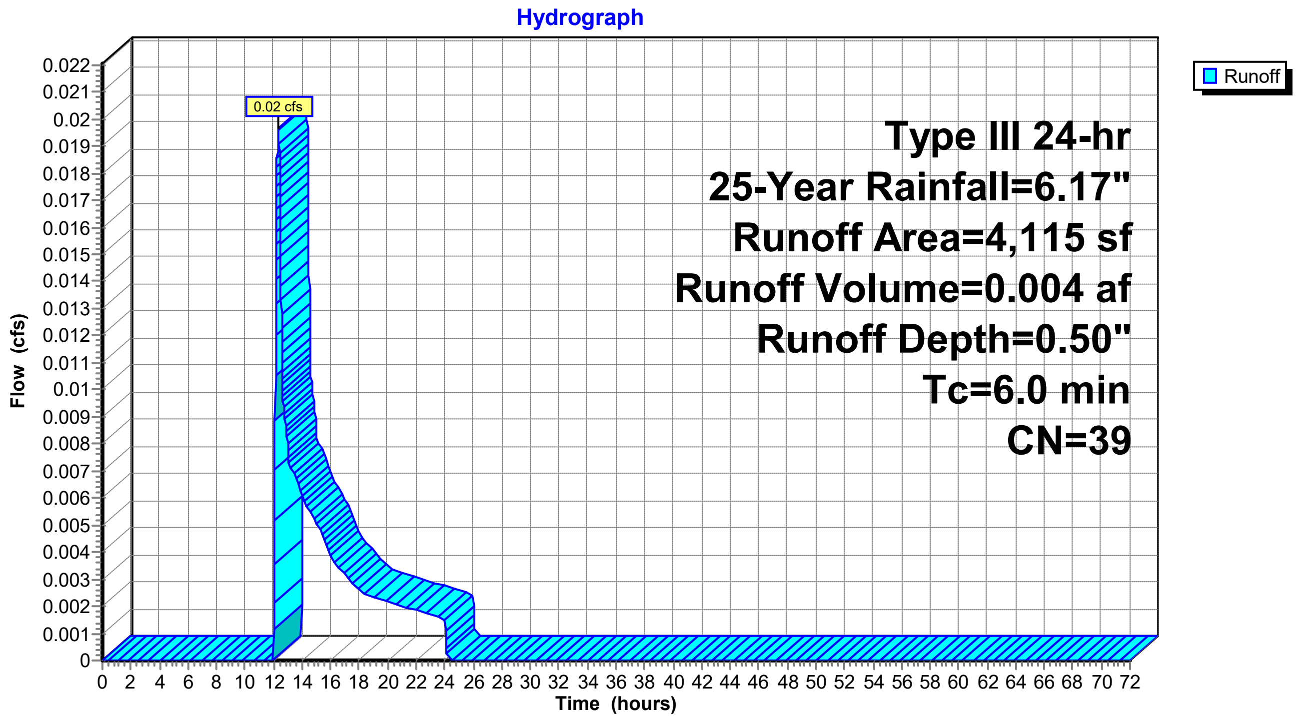
Runoff = 0.02 cfs @ 12.33 hrs, Volume= 0.004 af, Depth= 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.17"

Area (sf)	CN	Description
4,115	39	>75% Grass cover, Good, HSG A
4,115		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2



Summary for Pond P1: Porous Pavement

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=560)

Inflow Area =	0.686 ac, 71.84% Impervious, Inflow Depth = 4.04"	for 25-Year event	
Inflow =	3.22 cfs @ 12.09 hrs, Volume=	0.231 af	
Outflow =	1.19 cfs @ 12.04 hrs, Volume=	0.231 af,	Atten= 63%, Lag= 0.0 min
Discarded =	1.19 cfs @ 12.04 hrs, Volume=	0.231 af	
Primary =	0.00 cfs @ 0.00 hrs, Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 161.55' @ 12.35 hrs Surf.Area= 21,411 sf Storage= 1,280 cf
Flood Elev= 164.00' Surf.Area= 42,822 sf Storage= 11,383 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 4.6 min (815.0 - 810.4)

Volume	Invert	Avail.Storage	Storage Description
#1	161.40'	7,099 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 17,771 cf Overall - 23 cf Embedded = 17,749 cf x 40.0% Voids
#2	162.23'	4,261 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#3	161.73'	23 cf	**4.0" Round Pipe Storage** Inside #1 L= 258.0'
		11,383 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
161.40	21,411	0	0
162.23	21,411	17,771	17,771

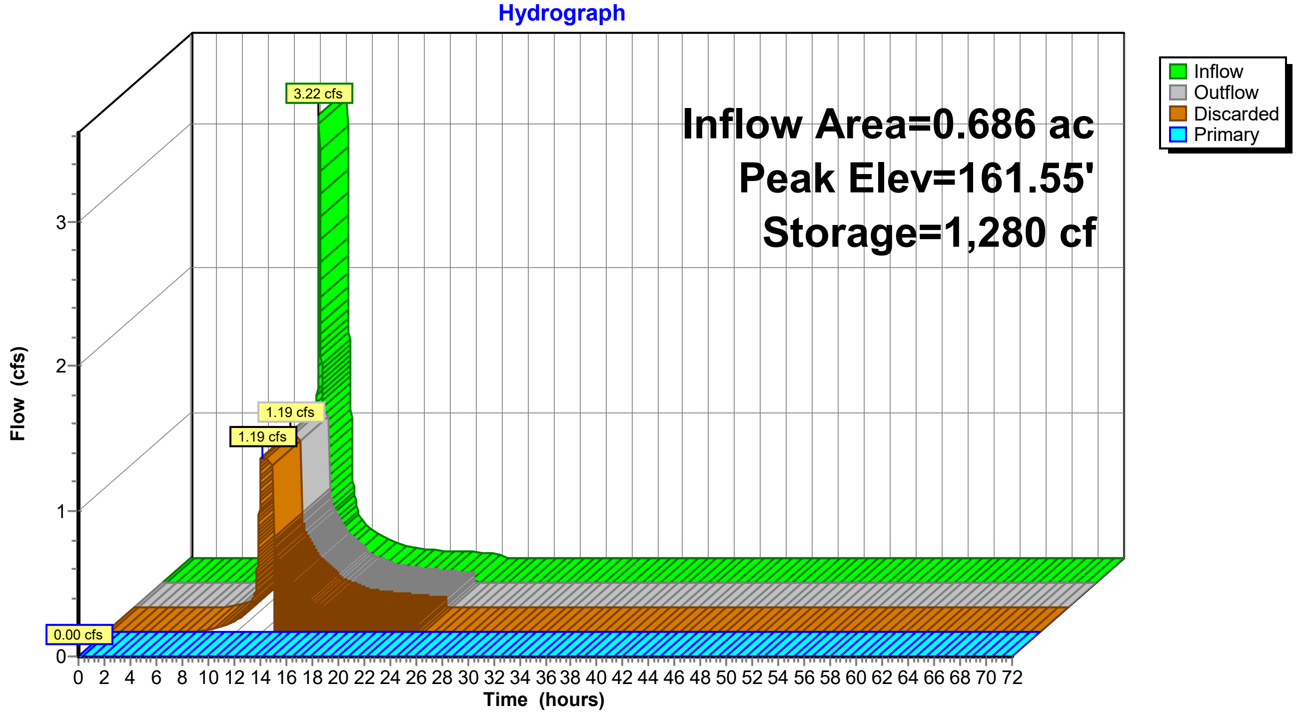
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
162.23	21,411	0.0	0	0
162.48	21,411	40.0	2,141	2,141
162.81	21,411	30.0	2,120	4,261

Device	Routing	Invert	Outlet Devices
#1	Primary	162.15'	**12.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 162.15' / 162.05' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	161.73'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	161.40'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.19 cfs @ 12.04 hrs HW=161.43' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.40' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond P1: Porous Pavement

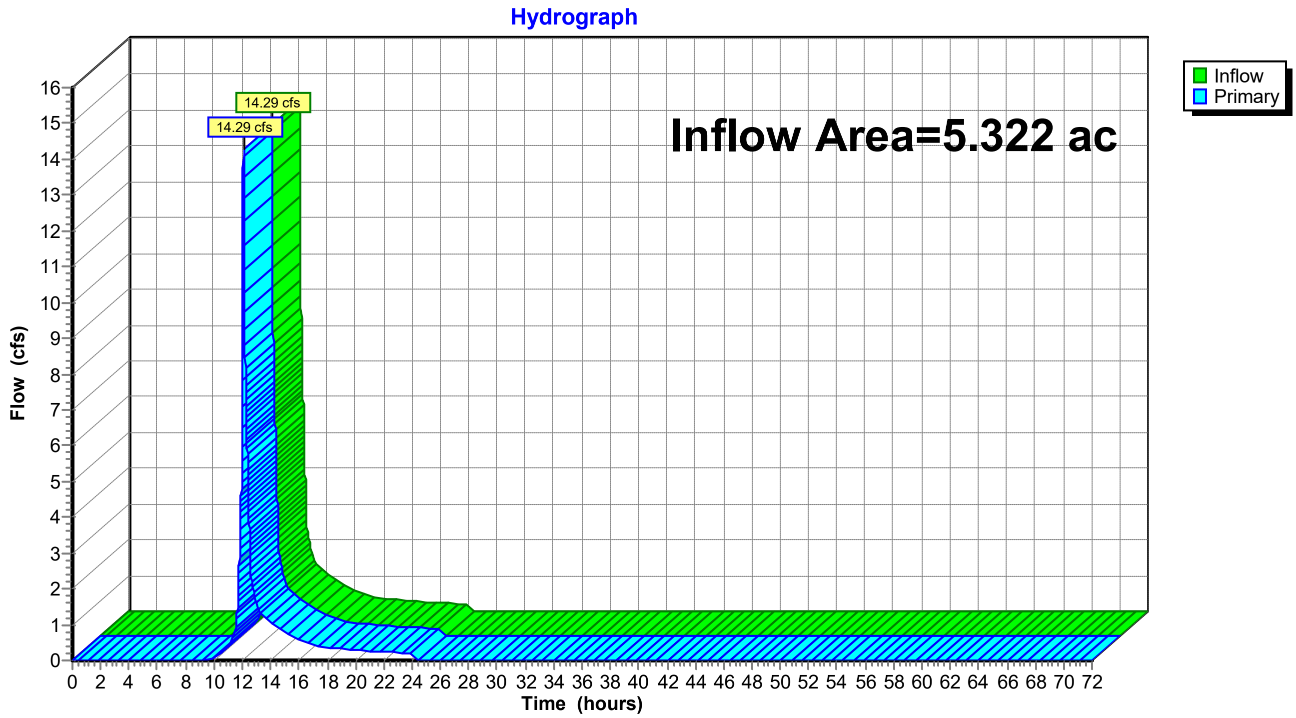


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area = 5.322 ac, 41.12% Impervious, Inflow Depth = 2.32" for 25-Year event
Inflow = 14.29 cfs @ 12.09 hrs, Volume= 1.027 af
Primary = 14.29 cfs @ 12.09 hrs, Volume= 1.027 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

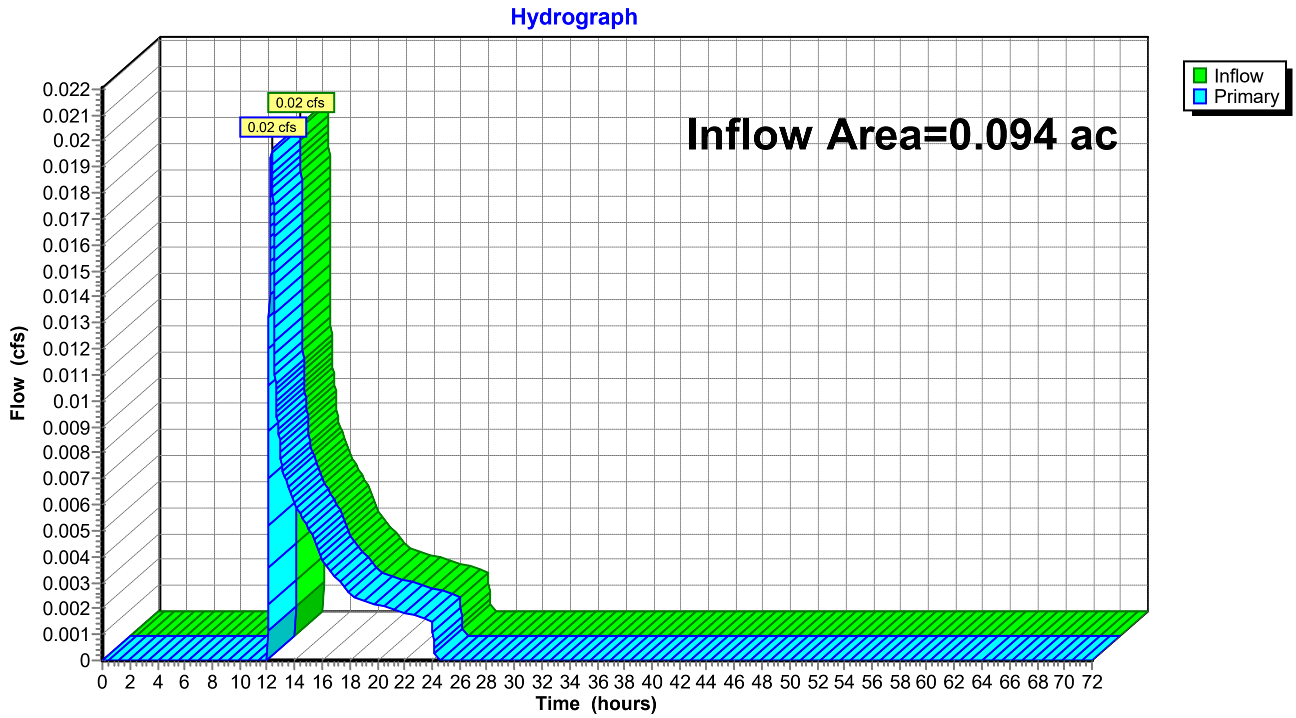


Summary for Link DP-2: Ditch

Inflow Area = 0.094 ac, 0.00% Impervious, Inflow Depth = 0.50" for 25-Year event
Inflow = 0.02 cfs @ 12.33 hrs, Volume= 0.004 af
Primary = 0.02 cfs @ 12.33 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A: Subcatchment 1 Runoff Area=201,945 sf 36.57% Impervious Runoff Depth=4.84"
Tc=6.0 min CN=67 Runoff=26.30 cfs 1.868 af

Subcatchment 1B: Area Draining to Runoff Area=29,873 sf 71.84% Impervious Runoff Depth=6.55"
Tc=6.0 min CN=81 Runoff=5.13 cfs 0.374 af

Subcatchment 2: Subcatchment 2 Runoff Area=4,115 sf 0.00% Impervious Runoff Depth=1.53"
Tc=6.0 min CN=39 Runoff=0.13 cfs 0.012 af

Pond P1: Porous Pavement Peak Elev=161.81' Storage=3,521 cf Inflow=5.13 cfs 0.374 af
Discarded=1.19 cfs 0.374 af Primary=0.00 cfs 0.000 af Outflow=1.19 cfs 0.374 af

Link DP-1: Reservoir and Swimming Area Inflow=26.30 cfs 1.868 af
Primary=26.30 cfs 1.868 af

Link DP-2: Ditch Inflow=0.13 cfs 0.012 af
Primary=0.13 cfs 0.012 af

Total Runoff Area = 5.416 ac Runoff Volume = 2.255 af Average Runoff Depth = 5.00"
59.60% Pervious = 3.228 ac 40.40% Impervious = 2.188 ac

Summary for Subcatchment 1A: Subcatchment 1 Minus Parking Lot

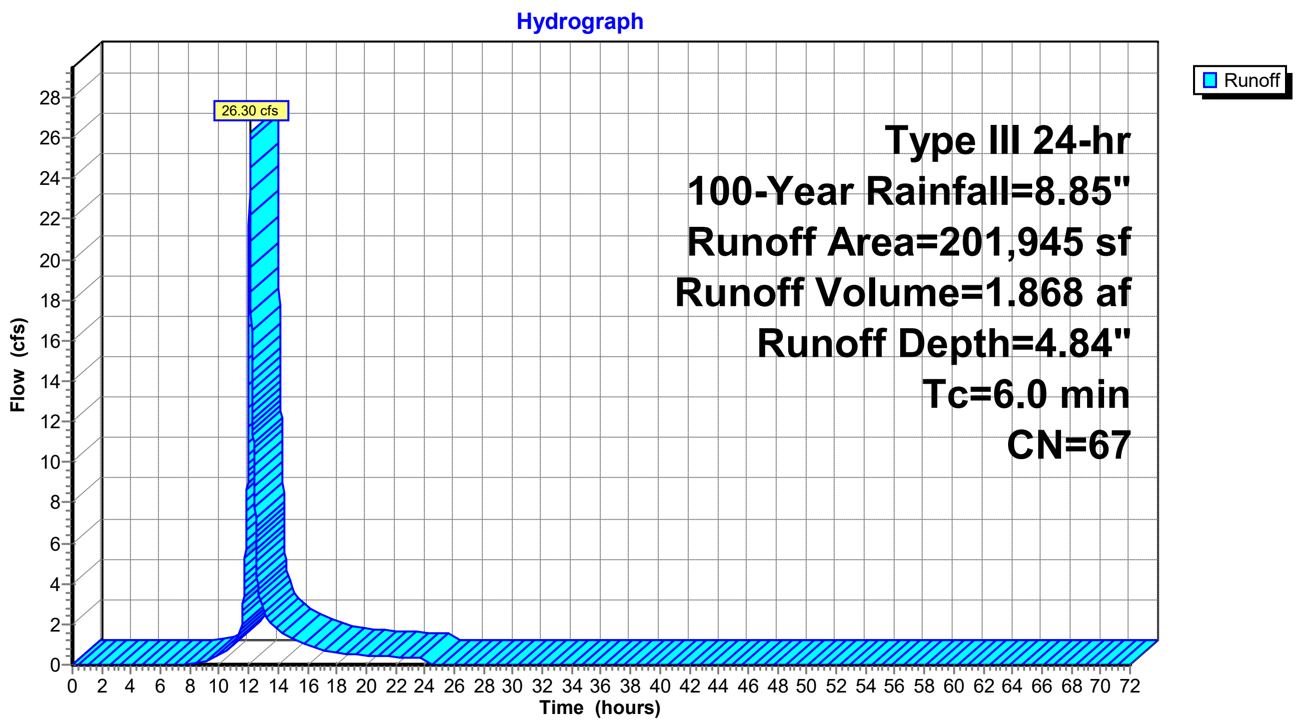
Runoff = 26.30 cfs @ 12.09 hrs, Volume= 1.868 af, Depth= 4.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.85"

	Area (sf)	CN	Description
	13,237	30	Brush, Good, HSG A
*	44,830	63	Beach Sand, HSG A
	56,001	39	>75% Grass cover, Good, HSG A
	19,764	98	Impervious Surface, HSG A
*	1,800	98	Porous Pavement, HSG A
	52,292	98	Water Surface, HSG A
*	6,010	96	Stone Dust, HSG A
*	8,011	39	Permeable Playground Surface, Good, HSG A
	201,945	67	Weighted Average
	128,089		63.43% Pervious Area
	73,856		36.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1A: Subcatchment 1 Minus Parking Lot



Summary for Subcatchment 1B: Area Draining to Parking Lot

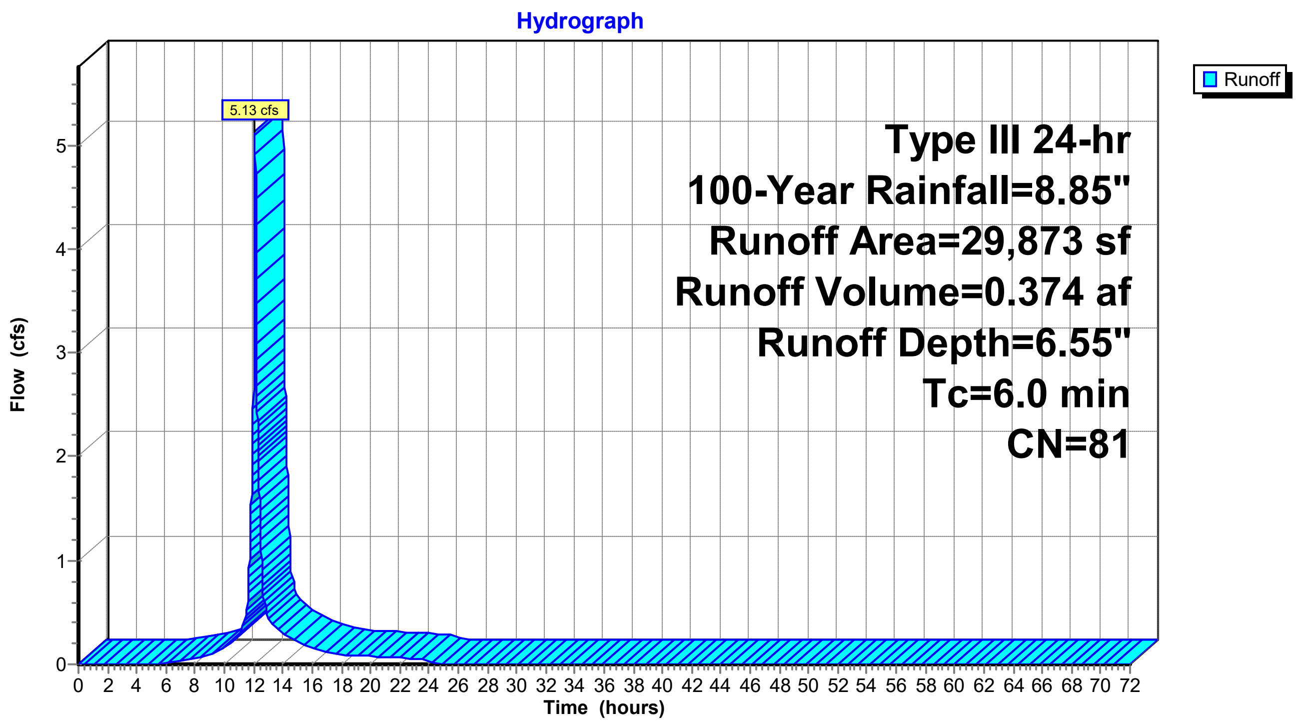
Runoff = 5.13 cfs @ 12.09 hrs, Volume= 0.374 af, Depth= 6.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.85"

	Area (sf)	CN	Description
	8,411	39	>75% Grass cover, Good, HSG A
	574	98	Impervious Surface, HSG A
*	20,888	98	Porous Pavement, HSG A
	29,873	81	Weighted Average
	8,411		28.16% Pervious Area
	21,462		71.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1B: Area Draining to Parking Lot



Summary for Subcatchment 2: Subcatchment 2

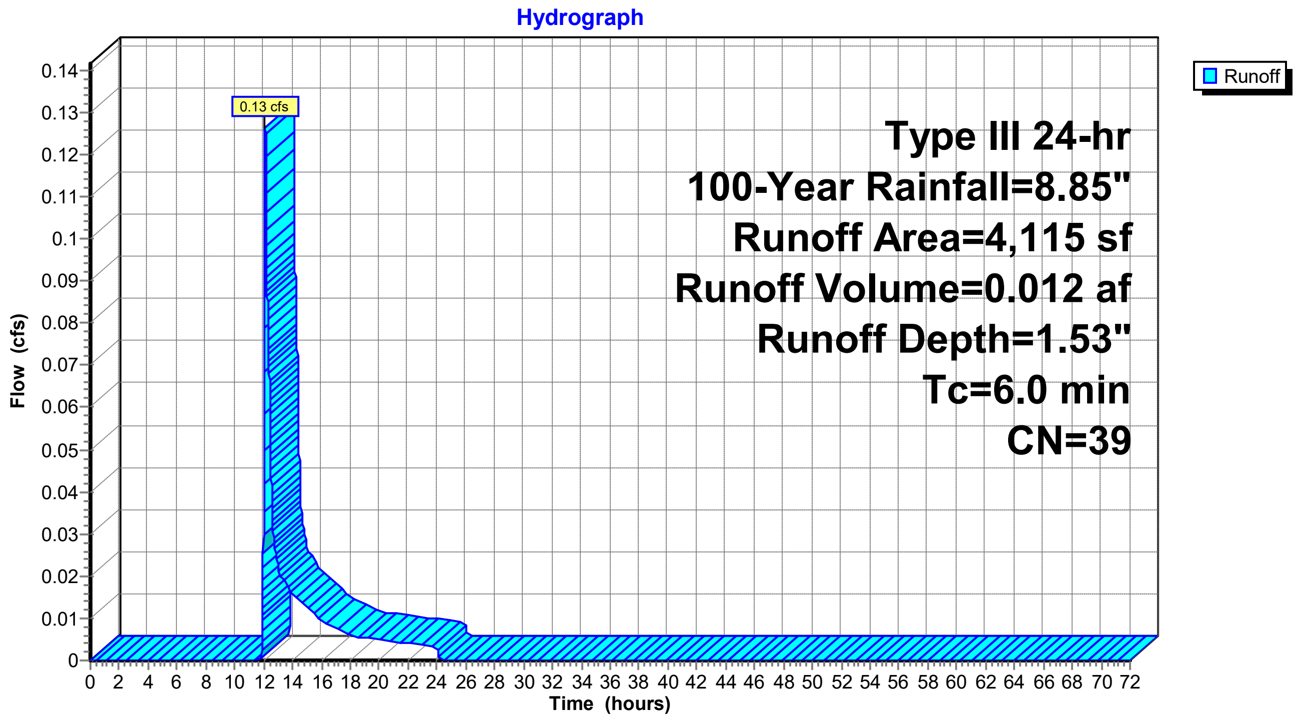
Runoff = 0.13 cfs @ 12.11 hrs, Volume= 0.012 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.85"

Area (sf)	CN	Description
4,115	39	>75% Grass cover, Good, HSG A
4,115		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2



Summary for Pond P1: Porous Pavement

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=514)

Inflow Area =	0.686 ac, 71.84% Impervious, Inflow Depth = 6.55"	for 100-Year event		
Inflow =	5.13 cfs @	12.09 hrs, Volume=	0.374 af	
Outflow =	1.19 cfs @	11.92 hrs, Volume=	0.374 af,	Atten= 77%, Lag= 0.0 min
Discarded =	1.19 cfs @	11.92 hrs, Volume=	0.374 af	
Primary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 161.81' @ 12.48 hrs Surf.Area= 21,411 sf Storage= 3,521 cf
Flood Elev= 164.00' Surf.Area= 42,822 sf Storage= 11,383 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 14.9 min (811.7 - 796.9)

Volume	Invert	Avail.Storage	Storage Description
#1	161.40'	7,099 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 17,771 cf Overall - 23 cf Embedded = 17,749 cf x 40.0% Voids
#2	162.23'	4,261 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#3	161.73'	23 cf	**4.0" Round Pipe Storage** Inside #1 L= 258.0'
		11,383 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
161.40	21,411	0	0
162.23	21,411	17,771	17,771

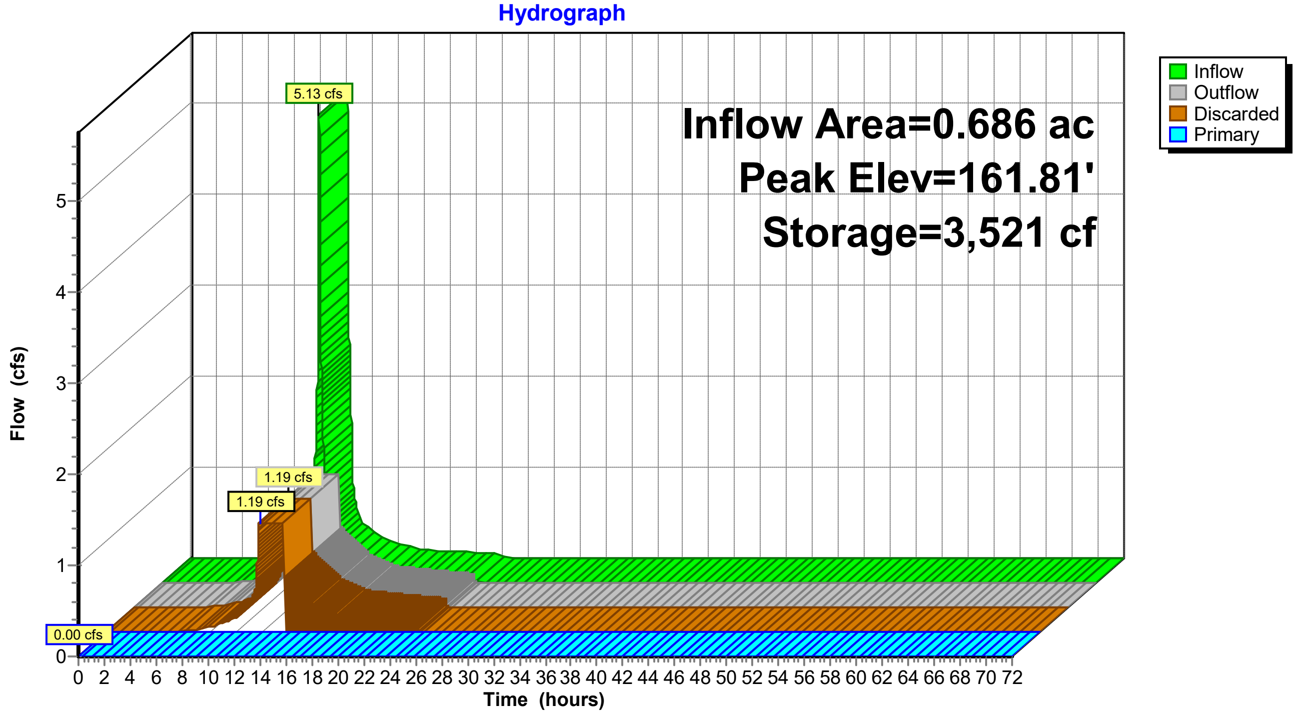
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
162.23	21,411	0.0	0	0
162.48	21,411	40.0	2,141	2,141
162.81	21,411	30.0	2,120	4,261

Device	Routing	Invert	Outlet Devices
#1	Primary	162.15'	**12.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 162.15' / 162.05' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	161.73'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	161.40'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.19 cfs @ 11.92 hrs HW=161.43' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.40' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond P1: Porous Pavement

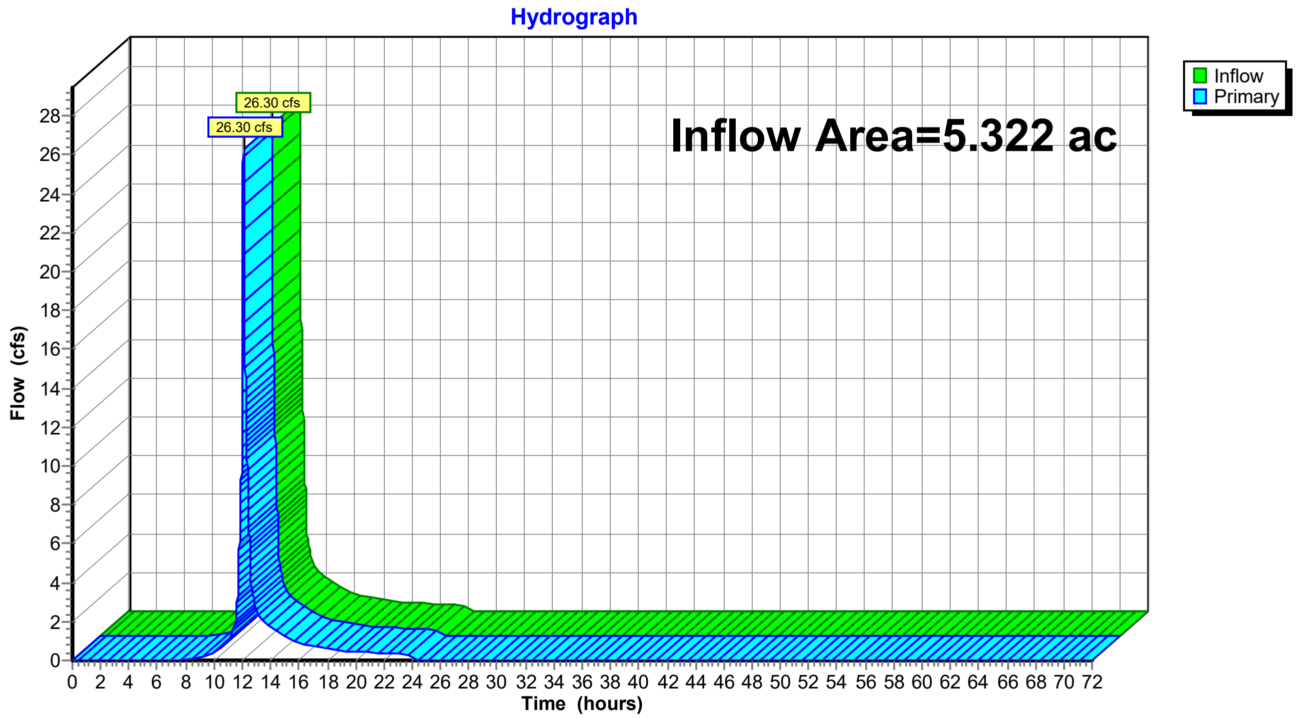


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.322 ac,	41.12% Impervious,	Inflow Depth = 4.21"	for 100-Year event	
Inflow =	26.30 cfs @	12.09 hrs,	Volume=	1.868 af	
Primary =	26.30 cfs @	12.09 hrs,	Volume=	1.868 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

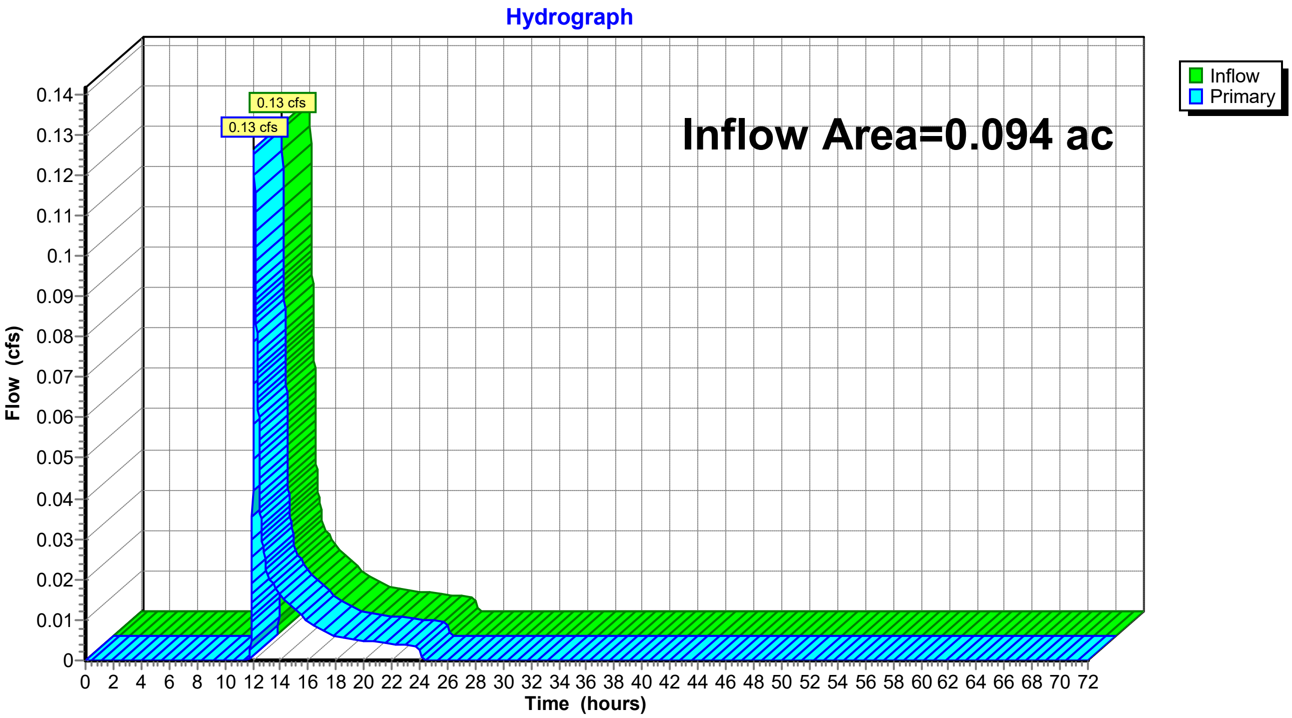


Summary for Link DP-2: Ditch

Inflow Area =	0.094 ac,	0.00% Impervious, Inflow Depth = 1.53"	for 100-Year event	
Inflow =	0.13 cfs @	12.11 hrs, Volume=	0.012 af	
Primary =	0.13 cfs @	12.11 hrs, Volume=	0.012 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



APPENDIX E: OPERATIONS & MAINTENANCE PLAN

STORMWATER MANAGEMENT SYSTEM
OPERATION & MAINTENANCE PLAN

This Stormwater Management System Operations & Maintenance Plan (the Plan) outlines measures that are essential for maintaining an effective stormwater management system at the Arlington Reservoir, located at 210 Lowell Street in Arlington, Massachusetts (the Site). Periodic and scheduled inspections and maintenance measures are recommended to prevent deficiencies and for proper performance of the stormwater management system. Failure to implement these measures can reduce the hydraulic capacity and the pollutant removal efficiency of stormwater measures resulting in a poor quality of stormwater runoff discharging from the Site.

RESPONSIBLE PARTY & ESTIMATED ANNUAL BUDGET

The party responsible for implementing this Plan and identifying the source of necessary funds is as follows:

Town of Arlington, Massachusetts – Department of Public Works
51 Grove Street
Arlington, MA 02476
Telephone: (781) 316-3301

GOOD HOUSEKEEPING

The Site will be maintained as clean and orderly. Routine inspections of the Site for debris and sediment accumulations shall be performed. Debris and sediment shall be disposed of in accordance with local and State requirements.

INSPECTIONS & MAINTENANCE MEASURES

Stormwater management is provided by porous pavement sections, as illustrated on the Site Plans. Routine inspections and maintenance of the stormwater management system shall be performed in accordance with this Operation & Maintenance Plan. These measures are recommended to prevent deficiencies within the system that may result in poor quality of stormwater runoff.

A sample Inspection Form is attached and is recommended for use during inspections of the stormwater management system. The form includes a table that outlines specific inspection and maintenance measures, in addition to the following information that can be recorded by the inspector during the inspection. Completed Inspections Forms shall be kept at the Site to enable both Department of Public Works staff members and regulatory agencies to ensure that operation of the system is in compliance with this Operation & Maintenance Plan.

SOLID WASTE CONTAINMENT

Trash and recycling receptacles will be provided throughout the Site, as necessary. Receptacles should remain covered to prevent exposure with stormwater and to ensure waste will remain inside the receptacle. Waste collection must be performed regularly.

LANDSCAPE MANAGEMENT

Lawn and landscaped areas shall be inspected for patches of dead vegetation and erosion. If these conditions are observed, affected areas shall be stabilized and replanted with vegetation to prevent sediment from entering the stormwater management system.

The following measures shall be followed to minimize the potential for stormwater runoff pollution due to overwatering, dead vegetation and erosion, direct disposal of lawn clippings, and over-application of materials such as fertilizers and pesticides.

<u>Lawn Mowing</u>

The following mowing practices are recommended:

- Maintain sharp mower blades.

- Typically, avoid cutting grass shorter than 2 to 3 inches in height, to minimize weed growth. Grass can be cut lower in the spring and fall to stimulate root growth but should not be cut shorter than $1^1/_2$ inches.
- Do not dispose of grass clippings within the stormwater management system.
- Employ practices to minimize the potential for grass clippings to enter the stormwater management system.

Fertilizers & Pesticides

Use of pesticides and fertilizers should be minimized to the extent practicable. Application of these materials may degrade the quality of stormwater runoff and should therefore be applied cautiously. In addition, fertilizers and pesticides shall not be applied prior to rain events. These materials should be stored under cover to prevent their exposure to stormwater.

PERVIOUS AREA MANAGEMENT

Winter Operations

Remove accumulated snow after winter storm events to keep the site's parking lots open for operations and maintenance activities. Snow shall not be stored within pervious areas.

Plows with poly cutting blades are required for snow removal. With their use, no alterations to typical snow removal activities are required. Sand will prematurely clog the porous pavement system and should not be used for deicing. Magnesium Chloride is an alternative material that can be used for deicing, if necessary. Snow melts faster on porous pavement than traditional pavement, as melting water does not remain on the surface to insulate the remaining ice.

Pervious Pavement

The pervious pavement system shall be monitored for permeability and maintained with an industrial wet vacuum sweeper at east twice a year or more frequently, as needed. The frequency of cleanings will vary depending on Site conditions including frequency of traffic, local climate, and surrounding environment but should be performed once in the Spring and once in the Fall (after leaves have fallen but before the first snow fall) to assure the pavement's long function life.

Damage to the surface of the porous pavement can be repaired by using a concrete saw to remove the damaged area and installing new porous pavement in its place.

STORMWATER MANAGEMENT SYSTEM INSPECTION FORM

Town of Arlington, Massachusetts
Arlington Reservoir
210 Lowell Street
Arlington, MA 02474

Name of Inspector: ______________________________

Date/Time: ______________________________

Weather: ______________________________

Date of Last Inspection: ______________________________

Items Inspected (refer to Table 1 and provide additional sheets if necessary):

Comments & Corrective Actions Taken (provide additional sheets if necessary):

Table 1 – Operations & Maintenance Measures

Porous Pavement	
Objective: *Maintain the infiltration and storage capacity of the porous pavement section.*	
Frequency	***Measure***
Ongoing/As Needed	• Monitor the surface of the porous pavement to proper drainage is achieved during storm events.
Quarterly	• Remove sediment and organic debris on the porous pavement surface using a vacuum sweeper.
Bi-Annually (once in Spring and once in Fall)	• Inspect the surface of the porous pavement for deterioration or clogging. • Assess the infiltration capacity of the porous pavement sections.
Additional Comments	• Do not stockpile snow on porous pavement surface. This will require additional maintenance and vacuuming. • Do not sand over porous pavement surface.

APPENDIX F: STORMWATER POLLUTION PREVENTION PLAN

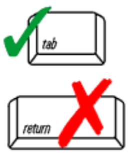
APPENDIX G: MASSDEP CHECKLIST FOR STORMWATER REPORT

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☐ New development

☒ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

☐ No disturbance to any Wetland Resource Areas

☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☒ Reduced Impervious Area (Redevelopment Only)

☒ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

- ☐ Credit 1
- ☐ Credit 2
- ☐ Credit 3

☒ Use of “country drainage” versus curb and gutter conveyance and pipe

☐ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☐ Other (describe): ____________________

Standard 1: No New Untreated Discharges

☒ No new untreated discharges

☐ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth

☐ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☐ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☐ Static ☒ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☒ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☐ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

  ☐ is within the Zone II or Interim Wellhead Protection Area

  ☐ is near or to other critical areas

  ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)

  ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☐ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

- ☐ The BMP is sized (and calculations provided) based on:
  - ☐ The ½" or 1" Water Quality Volume or
  - ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- ☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- ☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

- ☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- ☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.
- ☒ The NPDES Multi-Sector General Permit does ***not*** cover the land use.
- ☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- ☐ All exposure has been eliminated.
- ☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- ☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

- ☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- ☒ Critical areas and BMPs are identified in the Stormwater Report.

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☒ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☒ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☒ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☒ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☒ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☐ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☐ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☒ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☐ An Illicit Discharge Compliance Statement is attached;

☒ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

WOODARD
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COMMITMENT & INTEGRITY DRIVE RESULTS

kzla

Notice of Intent – Additional Information
Arlington Reservoir Phase 2 Implementation
30 December 2020

This memo is to address three topics addressing the landscape during the December 17th Conservation Commission hearing:

1. **Stabilized crushed granite path system requested by the Lexington Conservation Commission & representative examples in the area**

   It was mentioned on the site walk held on Friday, September 4, 2020 with members of both the Arlington & Lexington Conservation Commission that the Lexington Conservation Commission does not consider a stabilized stonedust material to be a porous pavement system. The Commission prefers a stabilized crushed granite pavement surface. The difference between the two is in the specifying of a stonedust product which could be comprised of a 3/8" minus crushed quartz-based stone versus a 3/8" minus crushed granite. Both are blended with a water-activated binder.

   Read Custom Soils is a local purveyor (Wareham, MA) of engineered and blended soils who specializes in providing this type of soils, including Organic-Lock (or approved equal). Organic-Lock, is a stabilized product which meets the Lexington requirements. Organic-Lock as provided by Read Custom Soils comes in 5 different colors each sourced from a different quarry. The "natural gray" color is sourced from a West Roxbury granite quarry, and therefore meeting the Lexington Commission's request for stabilized crushed granite.

   It is worth noting that this stabilized pathway system is used in limited area within the Arlington portion of the Res recreation area. The vast majority of the trail encircling the Res is proposed to be comprised of a crushed stone surface with no stabilizer. The grades for most of the pathways are flat enough that the stabilized is not necessary. The only places within Arlington where the stabilized crushed granite system is proposed are:
   a. The sloped walkway connecting Drake Village to the perimeter trail. We have proposed the stabilizer here as the trail connection is just under 5% and we do not want the fine material to move with stormwater.
   b. The pathway connecting the concrete beach walkway along the south embankment of the swimming area. We have proposed the stabilizer in this location as the pathway has water on both sides and we want to be sure the fine material does not wash into either the swimming area or the Res.
   c. The trail which parallels the main parking lot between the lot and the Res. In this location we want to ensure that the 3/8-inch material does not migrate into the porous pavement system. We have also separated the two pavements with a 12-inch flush concrete curb to help separate the systems.

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The most local example of the stabilized crushed granite is at the New Visitor Center at Walden Pond in Concord. The pathways adjacent to the parking lot and around the reconstruction cabin are comprised of stabilized crush granite.
https://www.organic-lock.com/portfolio_page/walden-pond/

Additional information on the stabilized pathway system can be found at:
http://readcustomsoils.com/stabilized-soil/
https://www.organic-lock.com/decomposed-granite-stabilizer/

2. Tree replacements for trees proposed to be removed

Section 24 (Vegetation Removal & Replacement) of the Town's Wetland Protection Regulations requires that trees removed within the Conservation Commission's jurisdiction (resource areas) shall be replaced based on the schedule established on page 35 of the Regulations. We have reflected that schedule on Sheet L1.1 of our plans submitted to the Commission. This schedule shows that there are a total of 25 trees being removed, which requires a replacement of 44 trees based on caliper inch of removal.

Trees are only being removed if they are in a hazard condition or if they will be impacted by the proposed improvements to the extent that they will not survive. Per the project's planting plan (sheets series L4.1-L4.5), tree plantings are being located in the following locations:

- To add shade to the landscape around the beach area
- To complement the row of trees between the main parking and Lowell Street
- To accent and provide shade in the playground
- To accent the entry and screen the filtration building from the man parking
- To revegetate the areas around the perimeter targeted for invasive species management.

Th vast majority of tree species proposed for planning (plant schedules are located on sheets L4.2A and L4.4) are species native to Massachusetts.

3. The main parking lot's history being used as a snow storage area by the Arlington Department of Public Works.

After the Conservation Commission hearing, Joe Connelly, Arlington Recreation Director, spoke to Michael Rademacher, Arlington DPW Director. Rademacher has committed to not using the new parking lot for snow storage in the future.

End of memo

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MEMO

To: Arlington Conservation Commission
Copy to Lexington Conservation Commission

Date: December 31, 2020

From: Mickey Marcus
RE: Revised Plans and information for Arlington Restoration Master Plan Phase II

File: DEP File: 091-0327
SWCA File: 60780

Dear Commission Members:

At our last hearing, several plan revisions were requested by the Conservation Commission, and these have been provided in this memo, and the attachments. These include a revised stormwater report, revisions to the site plans, and clarifications on construction materials and methods of invasive species control.

<u>1) Information on Lexington's stabilized granite requirements.</u> A memo from KZLA is attached providing information on this path material and representative examples in the area.

<u>2) Recalculate stormwater calculations using NOAA Atlas 14</u>+. A revised stormwater report dated December 2020 is attached. This report has been prepared by Woodard & Curran Engineers and is stamped by Denise Cameron, PE.

<u>3) Review removal/replacement of trees.</u> The KZLA memo addresses this item and the planting plans (Sheets L4.1 and L4.5 have been revised. These plan revisions are attached.

<u>4) Add erosion controls (silt sack) around turf area in parking lot to prevent siltation.</u> The civil site plans have been revised to show compost filter erosion controls socks, and stone rip rap at the outfall pipes. These are shown Plan C1.0 and C2.0. Both revised plans are attached.

<u>5) Propose alternatives to glyphosate.</u> The recommended alternatives approved for use by the DEP include Garlon and Milestone. For the Phragmites and Reed Canary Grass we propose using Clearcast, also approved by MADEP. The Commission also asked for application methods other than spraying. For the woody plants we recommend stem cutting with the immediate wipe or wick application of the herbicide to the cut stems. A dye added to the herbicide mix may be used to show which stems have been treated. For the herbaceous plants, a glove-wipe application may be used (e.g. on swallowwort, reed canary grass). For several species such as the Phragmites, Japanese knotweed, and multiflora rose, the preferred treatment is a spray application.

6) Coordinate with DPW to ensure parking lot is not a snow dump. This item has been addressed in the KZLA memo. The Town DPW has committed not to use the new parking lot for snow storage in the future.

7) Possibly schedule another site visit, weather dependent. The project team will be available to meet with any Commission Members or Staff during the NOI review, prior to construction, or during the construction. A site walk with the Town of Lexington Conservation Commission is scheduled for Saturday January 2, 2021.

8) Revise parking lot O&M Plan to include regenerative air sweeper. The stormwater report O&M plan has been revised and this item is addressed on page 194 of the stormwater report. Regenerative air sweeping is recommended twice each year, or as needed.

9) Revise invasive management to include as much cut-and-dab, not spray, as possible. This is addressed in item number 5. All woody invasive plants will use the cut stem treatment and will not use spray for herbicide application.

10) Update plan set with changes (erosion controls, plan has erosion control matting near flared end, but rip rap might be better). These changes have been made as requested by the Commission and they are included on the attached plan revisions by Woodard & Curran Engineers and item #4.

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

LEGEND

L.O.W.	LIMIT OF WORK
	CONSTRUCTION FENCE
	TREE PROTECTION -FENCING, TYP. (1 / LD1.1)
	TREE PROTECTION -WOOD BOARD, TYP. (4 / LD1.1)
	EROSION CONTROL -COMPOST SOCK, TYP. (2 / LD1.1)
	SAWCUT LINE, TYP.
	SILT SACK INLET PROTECTION (3 / LD1.1)
	LIGHT POST TO REMAIN AND BE PROTECTED, TYP.
	INVASIVE MANAGEMENT AREA
	GRANITE MILE MARKER
	APPROXIMATE TOP OF BANK
	100' TOP OF BANK BUFFER
24"	REMOVE TREE OR SHRUB, TYP. (SIZE, DBH)
24"	REMOVE INVASIVE TREE OR SHRUB (SIZE, DBH)
24"	PRUNE TREE, (SIZE, DBH)
R&D	REMOVE AND DISPOSE
R&S	REMOVE AND STOCKPILE
R&R	REMOVE AND RESET
	200' RIVERFRONT AREA
	REMOVE AND DISPOSE 10" OF STONE DUST AND GRAVEL BASE
	REMOVE AND DISPOSE ASPHALT, TYP.
	REMOVE AND DISPOSE GRAVEL, TYP.
	STRIP AND STOCKPILE LOAM, TYP.
	CLEAR AND GRUB, TYP.
	AIRSPADE EXISTING PATH, TYP.
	EXCAVATE 9" OF EX. PATH, TYP. OR FOR PROPOSED PATH, TYP.
	SCARIFY STONEDUST PATH, TYP.
	REMOVE AND DISPOSE CONCRETE PAVEMENT, TYP.

NOTE:
1. PROTECT STOCKPILED MATERIALS DURING CONSTRUCTION
2. ALL GRANITE BENCHES TO BE R&S FOR REUSE ON SITE; ALL GRANITE MILE MAKERS TO BE R&R
3. ALL WOOD SIGN POSTS, UNLESS OTHERWISE DESIGNATED, TO BE R&R

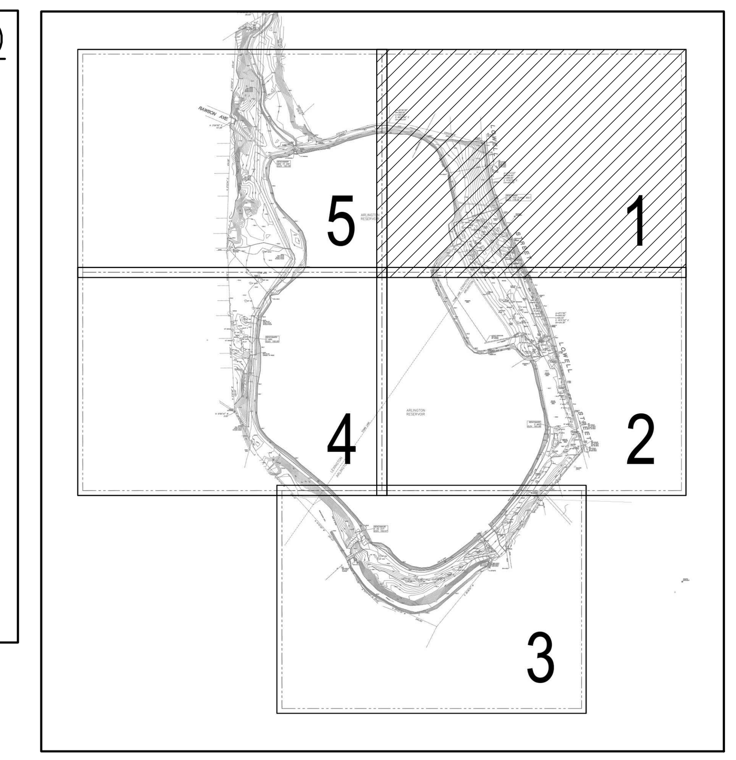
SITE PREPARATION AND DEMOLITION NOTES:

1. PRIOR TO COMMENCING ANY EXCAVATION WORK, THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES IN ACCORDANCE WITH THE "DIG SAFE" NOTIFICATION PROCEDURES PROMOTED BY RESPECTIVE UTILITY COMPANIES. THE DIG SAFE TELEPHONE NUMBER FOR MASSACHUSETTS IS 811.
2. PRIOR TO COMMENCING EARTHWORK, EROSION & SEDIMENTATION CONTROLS MUST BE IN PLACE, INCLUDING BUT NOT LIMITED TO COMPOST SOCKS AND SILT SACKS.
3. THE LOCATIONS OF ALL UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE DIAGRAMMATIC ONLY. THE CONTRACTOR SHALL CONTACT THE PROPER LOCAL AUTHORITIES OR RESPECTIVE UTILITY COMPANY TO CONFIRM THE LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. ANY DAMAGE DUE TO FAILURE OF THE CONTRACTOR TO CONTACT THE PROPER AUTHORITIES SHALL BE BORNE BY THE CONTRACTOR.
4. ALL REFUSE, DEBRIS, AND MISCELLANEOUS ITEMS TO BE REMOVED, THAT ARE NOT TO BE STOCKPILED FOR LATER USE ON THE PROJECT OR DELIVERED TO THE OWNER, SHALL BE LEGALLY DISPOSED OF OFF-SITE BY THE CONTRACTOR.
5. ALL ITEMS REQUIRING REMOVAL SHALL BE REMOVED TO FULL DEPTH TO INCLUDE BASE MATERIAL AND FOOTINGS OR FOUNDATIONS AS APPLICABLE, AND REUSED AS DIRECTED BY THE OWNER OR LEGALLY DISPOSED OF OFF-SITE BY CONTRACTOR.
6. CONTRACTOR SHALL STRIP AND STOCKPILE EXISTING TOPSOIL TO FULL DEPTH WITHIN LIMIT OF GRADING BEFORE COMMENCING EXCAVATION AND GRADING OPERATIONS. TOPSOIL SHALL NOT BE REMOVED FROM THE SITE, UNLESS APPROVED BY THE LANDSCAPE ARCHITECT.
7. ALL MATERIALS THAT ARE TO BE STORED & STOCKPILED ON SITE THAT ARE LOOSE AND MAY WASH WITH RAIN EVENTS, ARE TO BE COVERED WITH A TARP AND/OR SURROUNDED WITH EROSION &SEDIMENT CONTROLS.
8. AT ALL LOCATIONS WHERE CONCRETE PAVEMENT OR BITUMINOUS CONCRETE ABUT NEW CONSTRUCTION, THE EDGE OF THE EXISTING CURB OR PAVEMENT SHALL BE SAWCUT TO A CLEAN, SMOOTH EDGE.
9. BEFORE ANY TREE CLEARING OR PRUNING IS DONE, THE CONTRACTOR SHALL ARRANGE A CONFERENCE ON THE SITE WITH THE LANDSCAPE ARCHITECT AND TREE WARDEN TO IDENTIFY TREES WHICH ARE TO BE PRUNED, PROTECTED OR REMOVED. DO NO CLEARING OR PRUNING WITHOUT A CLEAR UNDERSTANDING OF EXISTING CONDITIONS TO BE PRESERVED.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING TREES AND PLANTS DESIGNATED TO REMAIN FOR THE LENGTH OF THE CONSTRUCTION PERIOD. PROTECTION TO INCLUDE TRUNK, ROOTS, AND OVERHEAD BRANCHES. THE PLACEMENT OF PROTECTION DEVICES ADDITIONAL TO THOSE NOTED SHALL, HOWEVER, BE AT THE CONTRACTOR'S DISCRETION.
11. DAMAGE NO PLANTS TO REMAIN BY BURNING, PUMPING OF WATER, CUTTING OF LIVE ROOTS OR BRANCHES, OR BY ANY OTHER MEANS. NO PLANTS TO BE SAVED SHALL BE USED FOR CRANE STAYS, GUYS OR OTHER FASTENINGS. VEHICLES SHALL NOT BE PARKED WITHIN THE DRIP LINE OR WHERE DAMAGE MAY RESULT TO TREES TO BE SAVED. CONSTRUCTION MATERIALS SHALL NOT BE STORED BENEATH TREES TO BE SAVED.
12. THE GENERAL CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS IN THE FIELD AND REPORT ANY DISCREPANCIES BETWEEN PLANS AND ACTUAL CONDITIONS TO THE LANDSCAPE ARCHITECT PRIOR TO STARTING WORK.
13. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING CONDITIONS THAT ARE DUE TO CONTRACTOR OPERATIONS.
14. THE GENERAL CONTRACTOR SHALL MAINTAIN OR ADJUST TO NEW FINISH GRADE AS NECESSARY ALL UTILITY AND SITE STRUCTURES SUCH AS LIGHT POLES, SIGN POLES, MANHOLES, CATCH BASINS, HAND HOLES, WATER AND GAS GATES, HYDRANTS, ETC., FROM MAINTAINED UTILITY AND SITE SYSTEMS UNLESS OTHERWISE NOTED ON THE UTILITY DRAWINGS OR AS DIRECTED BY THE LANDSCAPE ARCHITECT.
15. THE GENERAL CONTRACTOR SHALL COORDINATE ALL ADJUSTMENT OR ABANDONMENT OF UTILITIES WITH THE RESPECTIVE UTILITY COMPANY.
16. ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS SHALL BE PROTECTED TO PREVENT TRACKING OF MUD ONTO PUBLIC WAYS. ANY MUD ON PUBLIC WAYS ORIGINATING FROM THE JOB SITE SHALL BE CLEANED BY THE CONTRACTOR.
17. CONTRACTOR SHALL SECURE ALL PERMITS THAT MAY BE REQUIRED FROM ALL JURISDICTIONS AFFECTED BY THIS WORK.
18. CONTRACTOR'S EQUIPMENT AND VEHICLES SHALL BE PARKED ON PAVED SURFACES ONLY. NO PARKING ON TURF OR SAND AREAS.
19. CONTRACTOR CAN REQUEST TO UTILIZE ADDITIONAL STAGING AREAS WITHIN THE LIMIT OF WORK. ALL STAGING AREAS, AS SHOWN ON THE PLANS OR ADDITIONAL AREAS REQUESTED BY THE CONTRACTOR, SHALL PROVIDE PROTECTION OF THE GROUND PER THE SPECIFICATIONS. NO ADDITIONAL COST CAN BE REQUESTED FOR ADDITIONAL STAGING AREAS.
20. WITHIN THE LIMIT OF WORK, CONTRACTOR SHALL IDENTIFY ALL TREE LIMBS LOWER THAN 10' ABOVE THE GROUND SURFACE THAT MAY BE VULNERABLE TO EQUIPMENT DAMAGE. NOTIFY THE LANDSCAPE ARCHITECT PRIOR TO STARTING WORK BENEATH ANY OF THESE LIMBS. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO TREE LIMBS THAT ARE DUE TO CONTRACTOR OPERATIONS.
21. CONTRACTOR TO CLEAN ALL DRAINAGE STRUCTURES WITHIN LIMIT OF WORK BEFORE SITE WORK BEGINS, AND AT THE END OF THE PROJECT. CONTRACTOR TO PROVIDE SILT SACKS FOR ALL CATCH BASINS WITHIN LIMIT OF WORK. CONTRACTOR TO CLEAN ALL DRAINAGE PIPES CONNECTED TO ALL CATCH BASINS THAT ARE WITHIN THE LIMIT OF WORK.

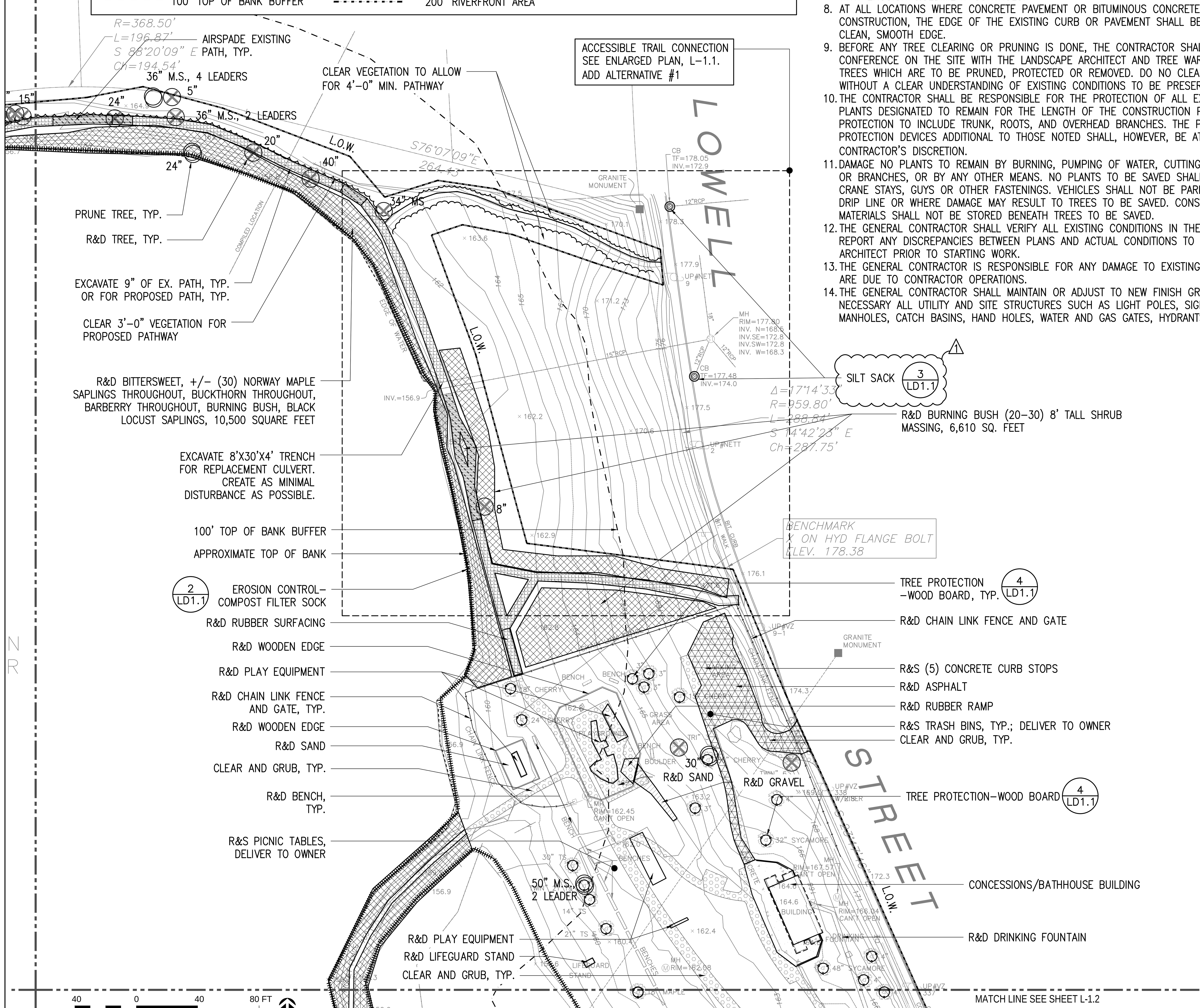
ARLINGTON TREE REMOVAL AND REPLACEMENT POLICY:

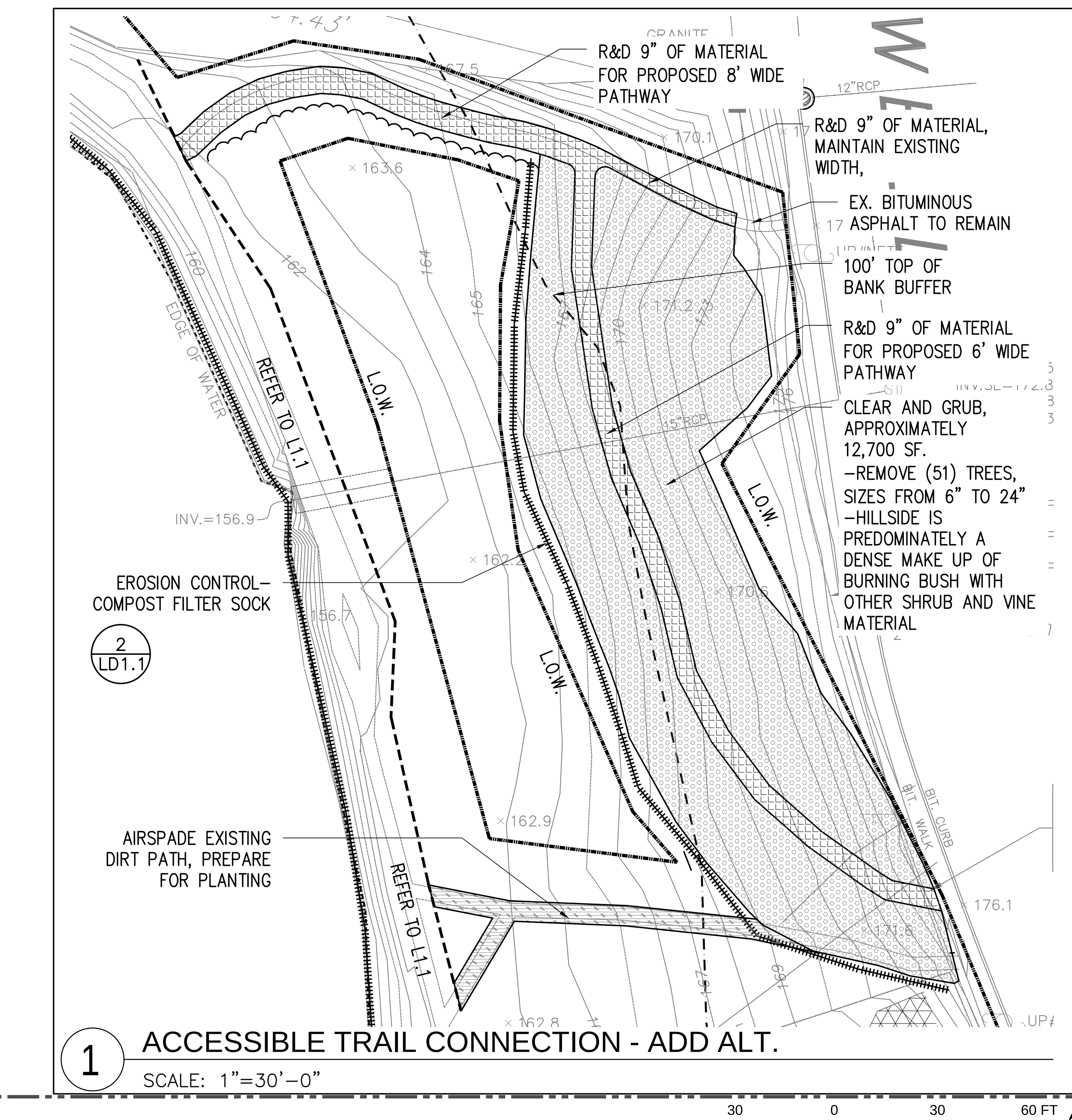
1. REMOVAL OF A 3-8" DBH TREE SHALL BE REPLACED WITH (1) TREE
2. REMOVAL OF A 9-20" DBH TREE SHALL BE REPLACED WITH (2) TREES
3. REMOVAL OF A 21"+ DBH TREE SHALL BE REPLACED WITH (3) TREES
4. TOTAL PROPOSED TREES TO REMOVE:

3-8"	=	11 TREES
9-20"	=	9 TREES
21"+	=	5 TREES
TOTAL	=	44 TREES



KEY PLAN





1 ACCESSIBLE TRAIL CONNECTION - ADD ALT.

SCALE: 1"=30'-0"

30 0 30 60 FT

NO.	REVISION	DATE
1	EROSION CONTROL	12.30.20

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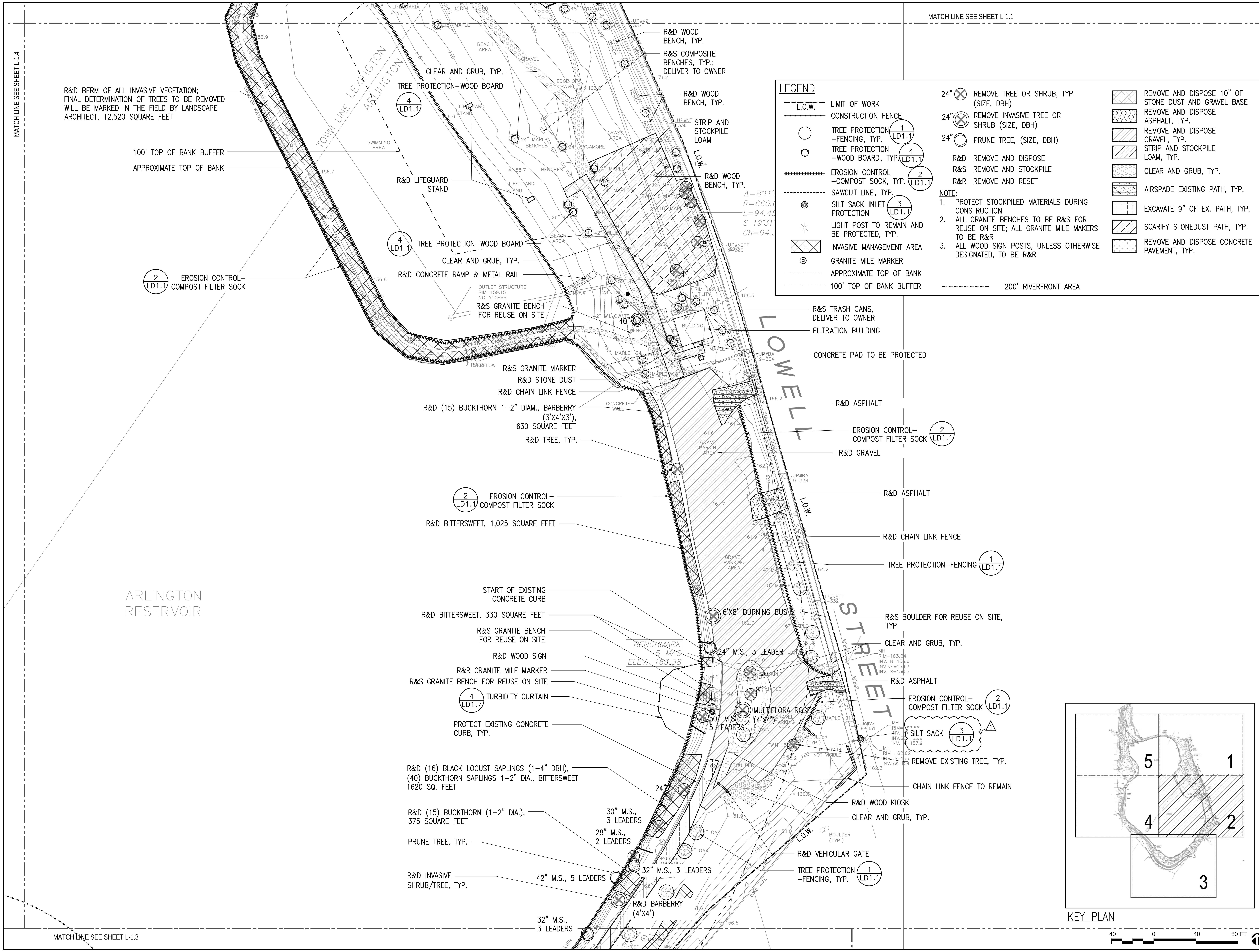
90% CONSTRUCTION DOCUMENT SET

Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB
Checked By: KZ
Date: DECEMBER 19, 2020
Scale: 1"=40'-0"
Drawing Title:

SITE PREPARATION AND DEMO PLAN

L1.1



ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO.	REVISION	DATE
1	EROSION CONTROL	12.30.20

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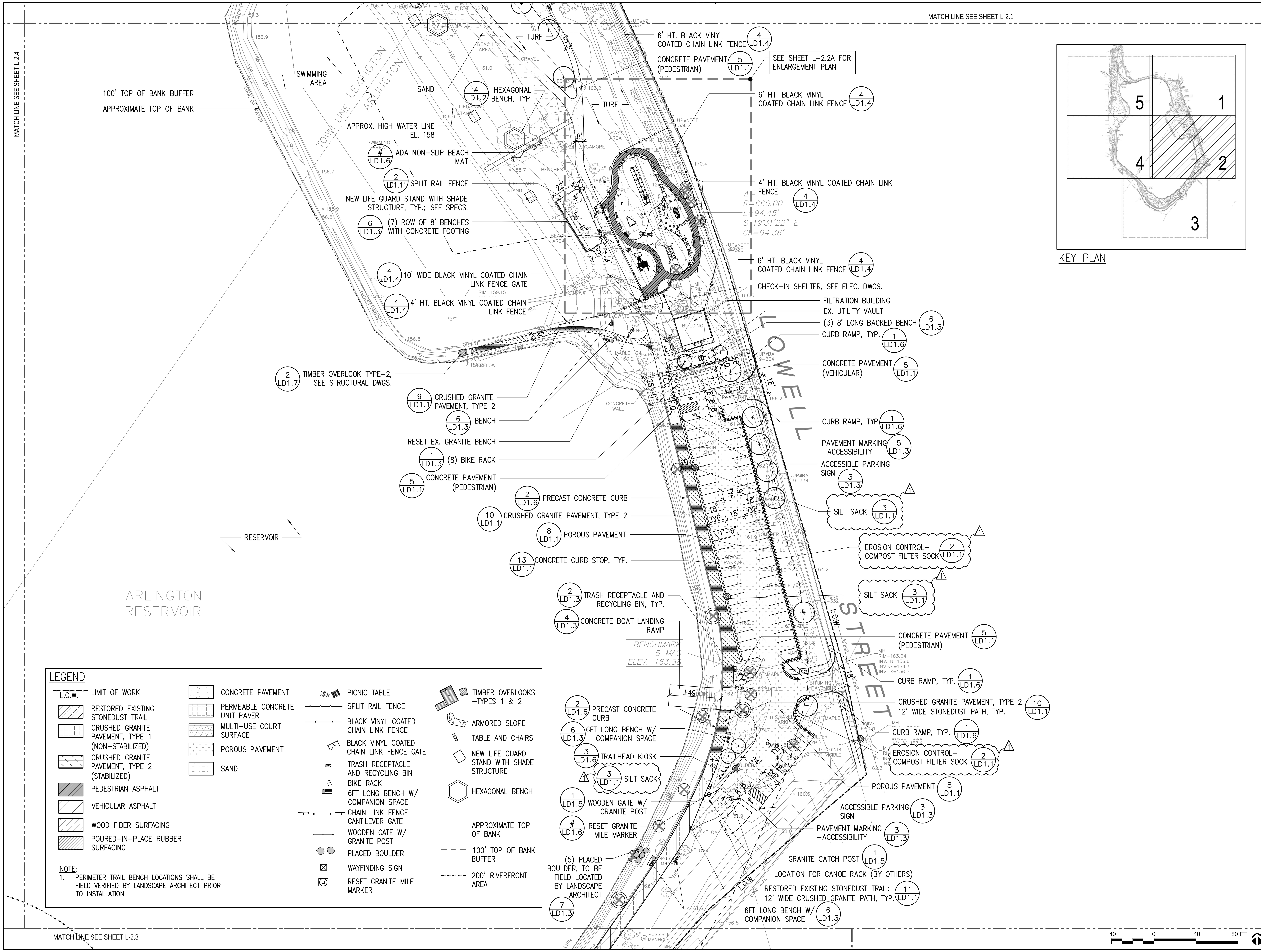
Date: DECEMBER 19, 2020
Scale: 1"=40'-0"
Drawing Title:

SITE PREPARATION AND DEMO PLAN

L1.2



ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO.	REVISION	DATE
1	EROSION CONTROL	12.30.20

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90% CONSTRUCTION DOCUMENT SET

Job Number:
Project: ARLINGTON RES.
Drawn By: JL/MD/RB
Checked By: KZ
Date: DECEMBER 19, 2020
Scale: 1"=40'-0"
Drawing Title:

LAYOUT AND MATERIAL PLAN

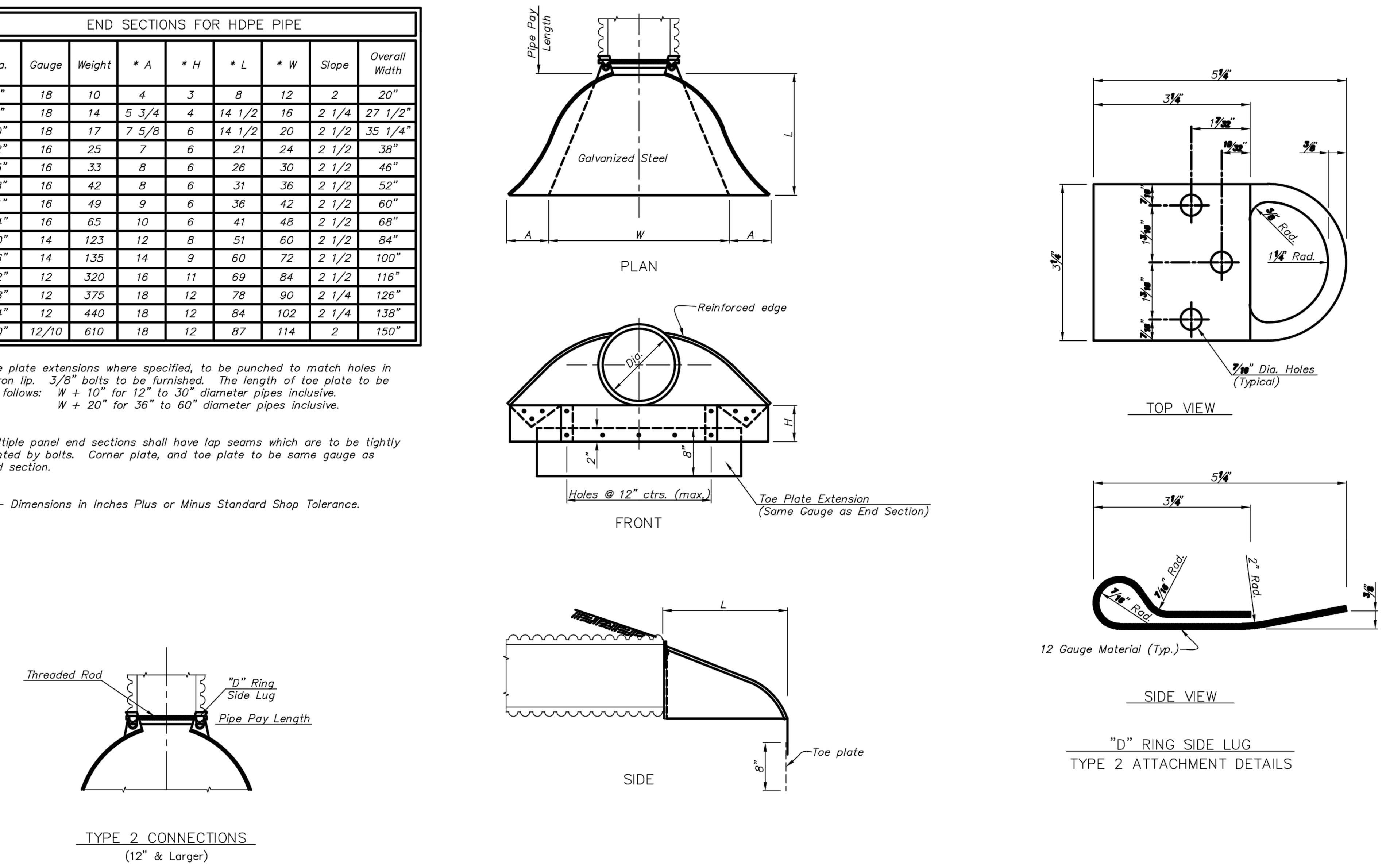
L2.2

END SECTIONS FOR HDPE PIPE								
Dia.	Gauge	Weight	* A	* H	* L	* W	Slope	Overall Width
6"	18	10	4	3	8	12	2	20"
8"	18	14	5 3/4	4	14 1/2	16	2 1/4	27 1/2"
10"	18	17	7 5/8	6	14 1/2	20	2 1/2	35 1/4"
12"	16	25	7	6	21	24	2 1/2	38"
15"	16	33	8	6	26	30	2 1/2	46"
18"	16	42	8	6	31	36	2 1/2	52"
21"	16	49	9	6	36	42	2 1/2	60"
24"	16	65	10	6	41	48	2 1/2	68"
30"	14	123	12	8	51	60	2 1/2	84"
36"	14	135	14	9	60	72	2 1/2	100"
42"	12	320	16	11	69	84	2 1/2	116"
48"	12	375	18	12	78	90	2 1/4	126"
54"	12	440	18	12	84	102	2 1/4	138"
60"	12/10	610	18	12	87	114	2	150"

Toe plate extensions where specified, to be punched to match holes in apron lip. 3/8" bolts to be furnished. The length of toe plate to be as follows: W + 10" for 12" to 30" diameter pipes inclusive. W + 20" for 36" to 60" diameter pipes inclusive.

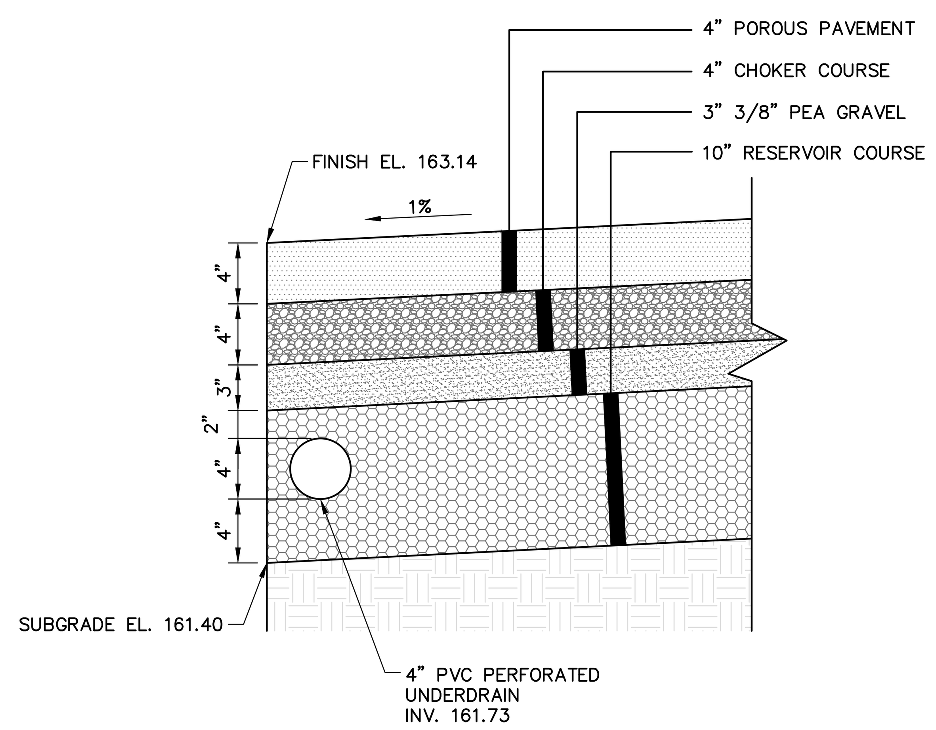
Multiple panel end sections shall have lap seams which are to be tightly jointed by bolts. Corner plate, and toe plate to be same gauge as end section.

** – Dimensions in Inches Plus or Minus Standard Shop Tolerance.*



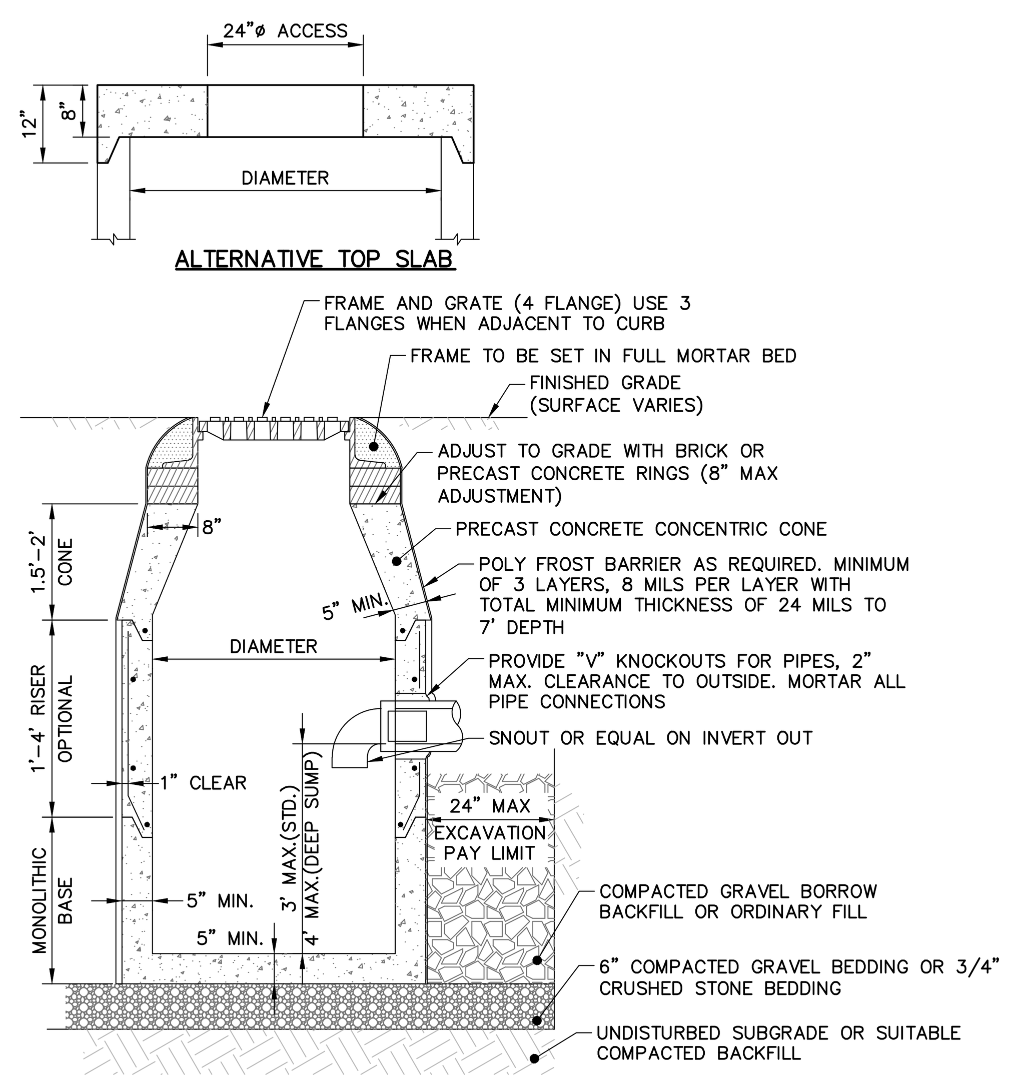
FLARED PIPE END DETAIL

N.T.S.



POROUS PAVEMENT SECTION

N.T.S.

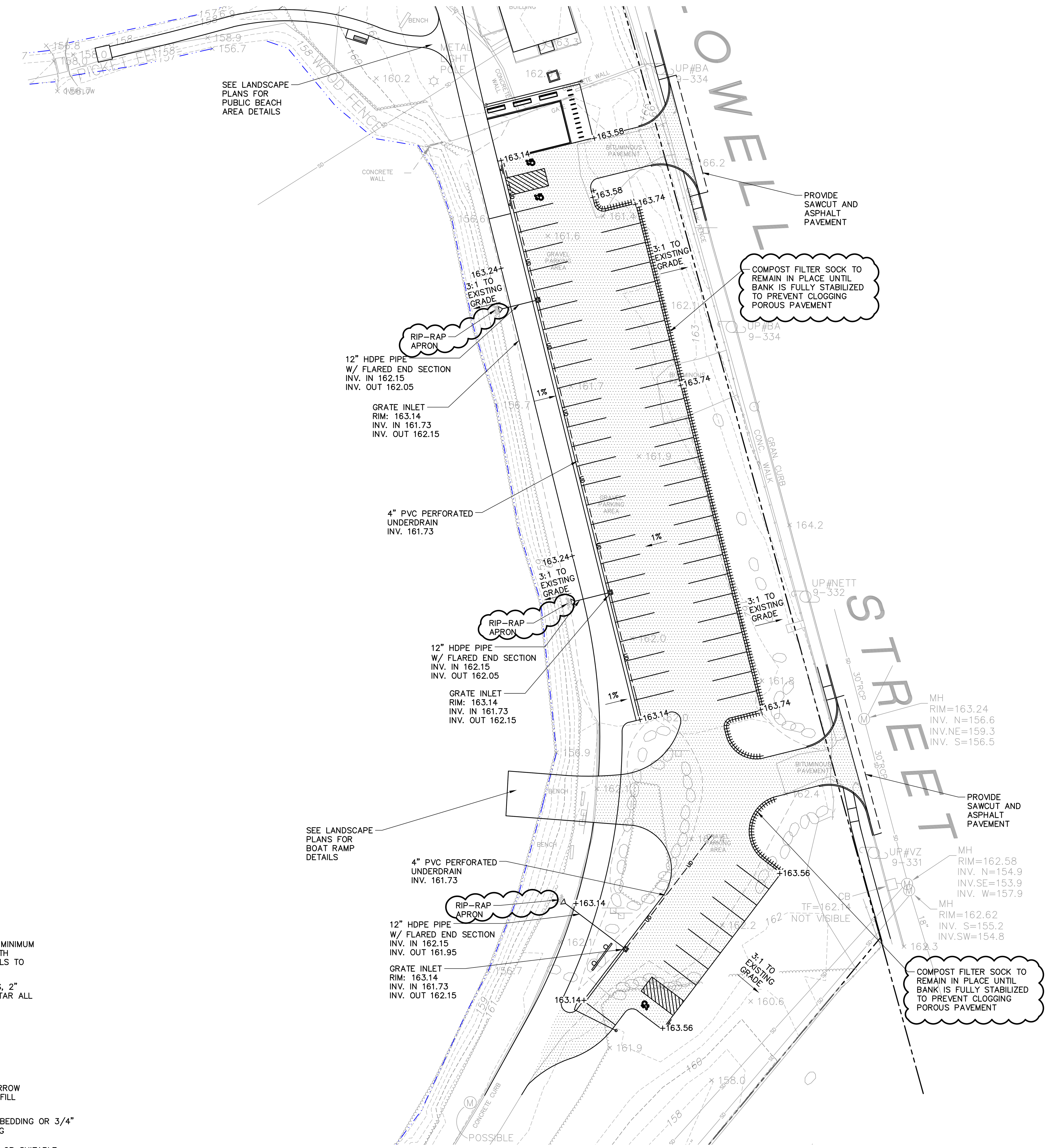


NOTES:

1. PRECAST CONCRETE STRUCTURES AND CASTINGS SHALL BE SUITABLE FOR HS-20 LOADINGS.
2. PRECAST CONCRETE STRUCTURES SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C-478.
3. ALTERNATE TOP SLAB MAY BE USED AS DICTATED BY DESIGN AND/OR FIELD CONDITIONS.
4. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE BUTYL RUBBER.
5. CATCH BASIN FRAME AND GRATE(S) SHALL MEET MUNICIPAL AND STATE SPECIFICATIONS WHEN APPLICABLE.

PRECAST CONCRETE CATCH BASIN

NOT TO SCALE



30' 0 30' 60'

BAR SCALE
1" = 30'
CHECK GRAPHIC SCALE BEFORE USING

NOT FOR CONSTRUCTION

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COMMITMENT & INTEGRITY DRIVE RESULTS

REV	DESCRIPTION	DATE
1	ARLINGTON CONSERVATION COMMISSION COMMENTS	12/30/2020

DESIGNED BY: LT | CHECKED BY: BM | DRAWN BY: BCM | 0233115.00 – C-1.dwg

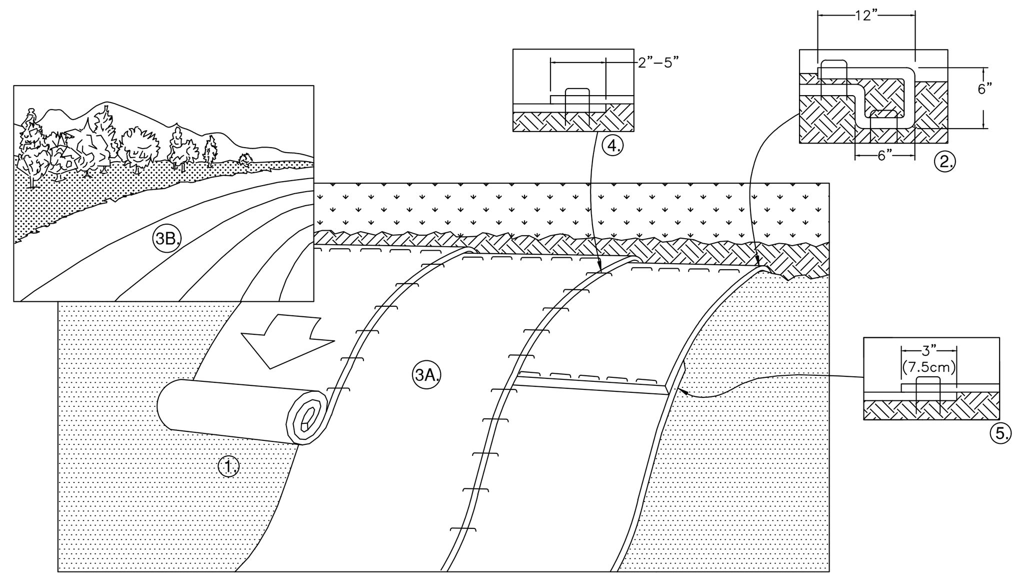
DRAINAGE PLAN

TOWN OF ARLINGTON
ARLINGTON, MASSACHUSETTS

ARLINGTON RESERVOIR PHASE 2

JOB NO.: 0233115.00
DATE: NOVEMBER 2020
SCALE: 1"=30'
SHEET: 1 OF 2

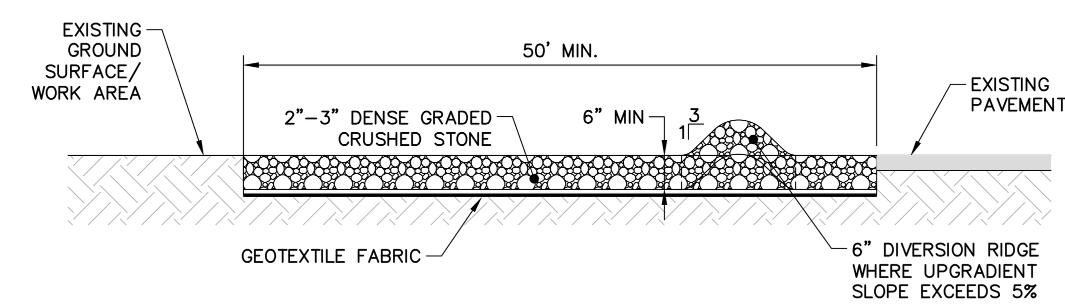
C1.0



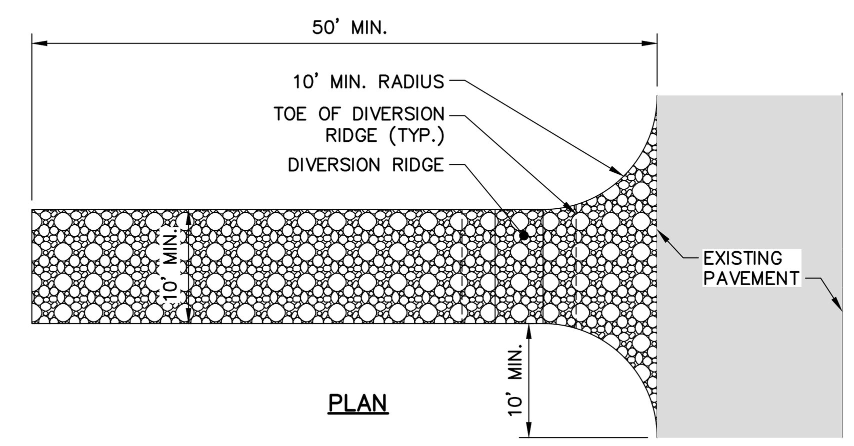
1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED AS WELL AS REMOVING ANY PROTRUDING ROCKS, STUMPS OR ROOTS. DURING THE GROWING SEASON (APRIL 15–SEPTEMBER 15) USE RECP'S ON THE BASE OF GRASSED WATERWAYS, SOIL SLOPES HAVING A GRADE GREATER THAT 15%, OR ANYWHERE WHERE HAY MULCH HAS PROVEN TO BE INEFFECTIVE AT CONTROLLING SHEET EROSION. RECP'S ARE A MANUFACTURED COMBINATION OF MULCH AND NETTING DESIGNED TO PREVENT EROSION AND RETAIN SOIL MOISTURE. FOR OVER WINTER PROTECTION, APPLY RECP'S ON THE BASE AND SIDE SLOPES OF GRASSED WATERWAYS AND ON SLOPES STEEPER THAN AN 8% GRADE.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECP's IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF RECP's EXTENDED BEYOND THE UP–SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF RECP's BACK OVER SEED AND COMPACTED SOIL. SECURE RECP's OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE RECP's.
3. ROLL THE RECP's (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL RECP's MUST BE STAPLED WITH APPROXIMATELY 2" – 5" OVERLAP DEPENDING ON RECP's TYPE.
5. CONSECUTIVE RECP's SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE RECP's WIDTH. NOTE: *IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY SECURE THE RECP's.
6. UNTIL GRASS IS ABUNDANT, INSPECT PERIODICALLY AND AFTER EACH RAINSTORM TO CHECK FOR EROSION. IMMEDIATELY REPAIR AND ADD MORE MULCH UNTIL GRASSES ARE FIRMLY ESTABLISHED. DO NOT MOW THE FIRST YEAR.

ROLLED EROSION CONTROL MATTING

N.T.S.



SECTION



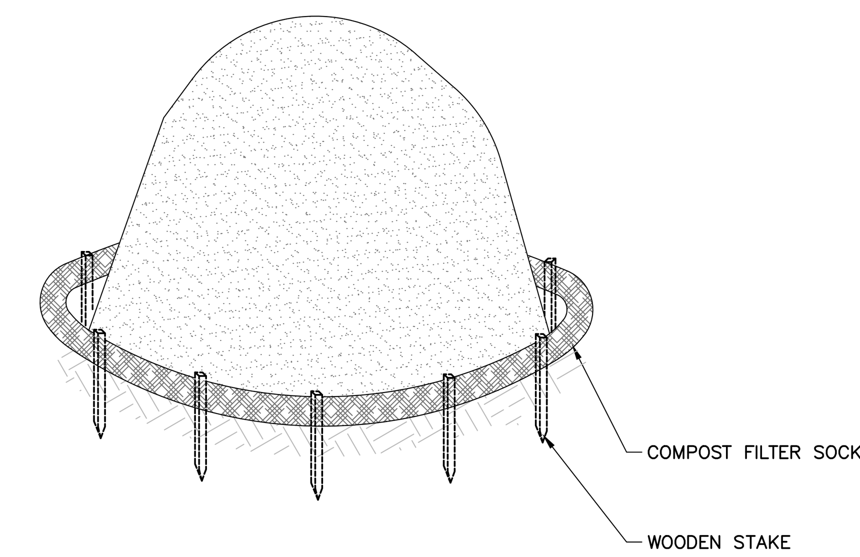
PLAN

NOTES:

1. GRADE TOWARDS SEDIMENT BARRIER WHEN NECESSARY TO MANAGE FLOW.
2. INCREASE MINIMUM LENGTH TO 100' WHERE TRACKED SEDIMENTS CONTAIN LESS THAN 80% SAND OR AS NECESSARY FOR HEAVY CONSTRUCTION.

STABILIZED CONSTRUCTION ENTRANCE/EXIT

N.T.S.

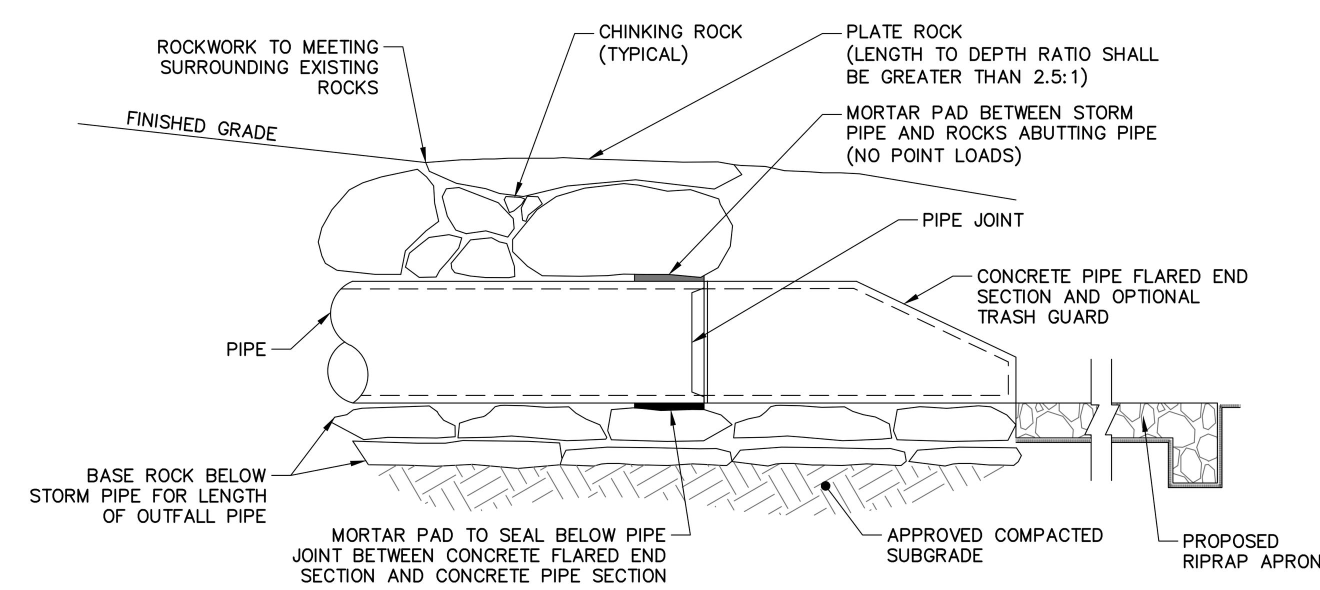


NOTES:

1. STOCKPILES SHALL BE SURROUNDED BY COMPOST FILTER SOCKS.
2. STOCKPILES SHALL HAVE A MAXIMUM 2:1 (H:V) SIDE SLOPE.
3. REPAIR OR REPLACE DAMAGED COMPOST FILTER SOCKS DUE TO CONSTRUCTION ACTIVITIES OR STOCKPILE MITIGATION.

TEMPORARY SOIL STOCKPILE

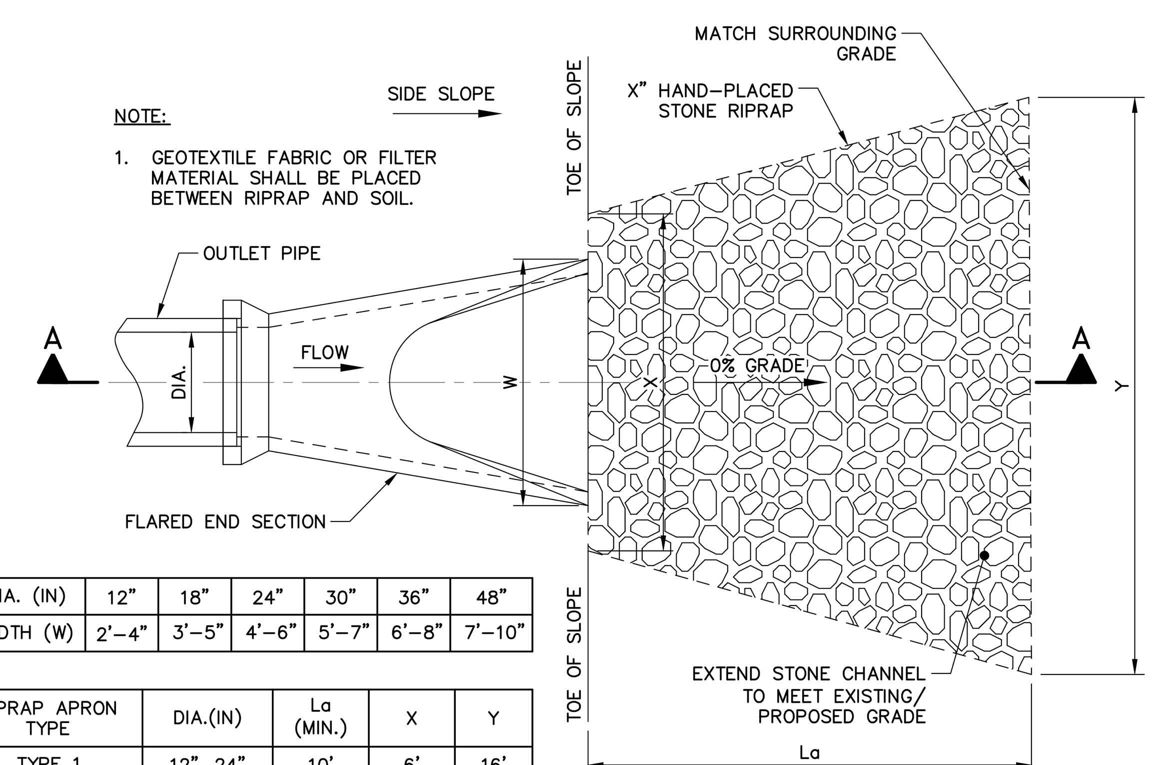
N.T.S.



SECTION A–A

NOTE:

1. GEOTEXTILE FABRIC OR FILTER MATERIAL SHALL BE PLACED BETWEEN RIPRAP AND SOIL.



DIA. (IN)	12"	18"	24"	30"	36"	48"
WIDTH (W)	2'–4"	3'–5"	4'–6"	5'–7"	6'–8"	7'–10"

RIPRAP APRON TYPE	DIA.(IN)	La (MIN.)	X	Y
TYPE 1	12"–24"	10'	6'	16'
TYPE 2	24"–48"	12'	9'	19'

PLAN

RIPRAP APRON OUTLET PROTECTION AT FLARED END

NOT TO SCALE

30' 0 30' 60'
BAR SCALE
1" = 30'
CHECK GRAPHIC SCALE BEFORE USING

NOT FOR CONSTRUCTION

WOODARD & CURRAN
40 Shattuck Road, Suite 110
Andover, Massachusetts 01810
866.702.6371 | www.woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

COMMONWEALTH OF MASSACHUSETTS
DENISE L. CAMERON
CIVIL
No. 53548
REGISTERED PROFESSIONAL ENGINEER

REV	DESCRIPTION	DATE
1	ARLINGTON CONSERVATION COMMISSION COMMENTS	12/30/2020

DESIGNED BY: LT
CHECKED BY: BM
DRAWN BY: BCM
0233115.00 – C–1.dwg

EROSION & SEDIMENT CONTROL DETAILS

TOWN OF ARLINGTON
ARLINGTON, MASSACHUSETTS

ARLINGTON RESERVOIR
PHASE 2

JOB NO.:0233115.00
DATE:NOVEMBER 2020
SCALE: 1"=30'
SHEET: 2 OF 2

C2.0

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WOODARD
&CURRAN

STORMWATER MANAGEMENT REPORT

Arlington Reservoir – Phase 2

40 Shattuck Road | Suite 110
Andover, Massachusetts 01810
800.426.4262

woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

0233115.00
Town of Arlington
Massachusetts
October 2020
Revised December 2020

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TABLES

APPENDICES

1. PROJECT DESCRIPTION

1.1 Introduction

On behalf of the Town of Arlington, Massachusetts (the Town), Woodard & Curran, Inc. (Woodard & Curran) has prepared this Stormwater Management Report for the proposed improvements to the Arlington Reservoir, located at 210 Lowell Street in Arlington, Massachusetts (the Site). The Town is proposing to revitalize the eastern shore of the Arlington Reservoir recreation area. Weston & Sampson Engineers, Inc. (Weston and Sampson), on behalf of the Town of Arlington, developed a Master Plan for the Reservoir in 2018. This proposed project encompasses Phase 2 of the Master Plan and improvements include installing porous pavement over the approximately 0.5-acre gravel parking area in the southern portion of the site, installation of new ADA-accessible pathways, a new play area, a multi-use court, a boat launch, and several other Site improvements as shown on the Post-Development Watershed Figure located in **Appendix C**. The impacts of these improvements to the Site's stormwater drainage patterns are summarized in this report.

1.2 Existing Conditions

A Site Locus Plan on a United States Geological Survey (USGS) Quadrangle Map depicting the project location has been provided in **Appendix A**. Arlington Reservoir is a 65-acre man-made recreational and stormwater-control pond on the Arlington and Lexington Town border. About half of the reservoir's open water is located in the Town of Lexington, however, the Town of Arlington owns and manages the reservoir. The earthen dam around the southern edge of the Reservoir is approximately 600 yards long and up to 14 feet tall. The water within the Reservoir discharges into Mill Brook through a sluice gate.

In 1935, the Town of Arlington constructed a sandy beach on the Reservoir's eastern shore. In the late 1970s, the Town completed improvements to the beach and added an embankment to separate the swimming area from the rest of the Reservoir. The beach now includes a filtered, chlorinated swimming area with a ramp for ADA accessibility, a bathhouse, vending machines, a concession area, and a playground. The Reservoir also has a one-mile walking trail around its perimeter, open to the public throughout the year.

1.2.1 Land Cover and Soils

Land cover and soils datasets were used to develop hydrologic curve numbers. Land cover was determined by a site visit conducted on September 3, 2020 and review of aerial photography and site survey data. A more detailed examination of the existing land cover within individual drainage subcatchments can be found in section 2.2.2. All existing impervious areas located within the Town of Lexington that are proposed to be replaced with a pervious land cover are required to be considered open space in good condition for stormwater calculations purposes per Lexington's Stormwater Management Regulations.

Soil characteristics were observed during test pit evaluations conducted in August 2020 and supplemented with information obtained from the United States Department of Agriculture's (USDA's) most recent Web Soil Survey. A Site map showing soil types and hydrologic soil group classifications within the project vicinity from the USDA's Web Soil Survey is located in **Appendix B**.

Test pits were conducted by Civil Design Consultants, Inc. (CDCI) of Methuen, Massachusetts on August 6, 2020 to evaluate the subsurface soil conditions and identify the estimated seasonal high groundwater table elevation. In all four borings conducted, CDCI observed a surface layer of fill ranging from 9 to 27 inches in depth, followed by a sandy loam layer extending to the bottom of each test pit. From these test pits, it was determined that at its highest elevation in the 0.5-acre parking lot, the seasonal high groundwater table is located approximately at elevation 159.40. Woodard & Curran used this data to locate the proposed stormwater best management practices (BMPs) at elevations with at

least two feet of separation from groundwater. Bedrock was not encountered during test pitting activities. The test pit logs and location figure provided by CDCI are located in **Appendix B**.

1.2.2 Topography

Subcatchment boundaries were delineated using the site survey performed and prepared by Weston & Sampson in December 2017. Topographically, the eastern shore of the Reservoir generally slopes downward from Lowell Street towards the Reservoir, with the exception of the southern-most portion of the 0.5-acre gravel parking area, which slopes downwards towards a ditch just north of the property located at 202 Lowell Street.

In both the pre- and post-development Site conditions, stormwater travels across the Site via overland flow and discharges into one of three Design Points: Arlington Reservoir, the on-Site swimming area, and the ditch located north of 202 Lowell Street. The Design Points and contributing areas are further described in Section 2.2.1. and are depicted in the Pre- and Post-Development Watershed Figures in **Appendix C**.

1.2.3 Resource and Critical Areas

Woodard & Curran reviewed Massachusetts Geographic Information System (MassGIS) data, the Massachusetts Department of Environmental Protection's (MassDEP's) Habitat of Potential Regional and Statewide Importance maps, the Massachusetts Stormwater Handbook, the Massachusetts Year 2016 Integrated List of Waters, and the Federal Emergency Management Agency's (FEMA's) National Flood Hazard Layer (NFHL) database. The findings of our review are below:

- The Massachusetts Endangered Species Act (MESA) protects rare species and their habitats by prohibiting the taking of any plant or animal species listed as Endangered, Threatened, or Special Concern by the Massachusetts Division of Fisheries & Wildlife. MESA review is required by the Natural Heritage & Endangered Species Program (NHESP) for projects and activities located within a Priority or Estimated Habitat of Rare Species. Review of the MassGIS Data shows there are no Priority or Estimated Habitats within the Project Area; therefore, the project is not subject to MESA review.
- Per MassGIS Data, there are no Certified or Potential Vernal Pools within or near the project area.
- Per MassGIS Data, the project is not located within any Areas of Critical Environmental Concern.
- Per the MassDEP's Habitat of Potential Regional and Statewide Importance maps for the Towns of Arlington and Lexington, the project in not located within a Habitat of Regional or Statewide Importance.
- Per the Massachusetts Stormwater Handbook, critical areas include Outstanding Resource Waters and Special Resource Waters, recharge areas for public water supplies, bathing beaches, cold-water fisheries, and shellfish growing areas. Review of MassGIS Data indicated that the Arlington Reservoir is not located within a resource area, however, the Swimming Area on the eastern shore of the Reservoir is classified as a bathing beach, as defined in 105 CMR 445, and thus a critical area.
- Per the Massachusetts Year 2016 Integrated List of Waters, Mill Brook, which receives discharges from Arlington Reservoir via a sluice gate on the southern portion of the Reservoir, is classified as a Category 5 water, meaning the waterbody requires a Total Maximum Daily Load (TMDL) restriction. Mill Brook's impairment of concern is Escherichia Coli (E. Coli). Proposed site improvements are not likely to increase E. Coli levels in Arlington Reservoir, and thus contributing to Mill Brook's impairment.

- Per FEMA's NFHL database, the majority of the Site is located within an area of minimal flood hazard (Zone X). The Reservoir's shoreline and the isolated swimming area are located within special flood hazard areas (Zone AE). The FEMA NFHL FIRMette Map is located in **Appendix A**.

Measures taken to address the presence of a critical area on-Site are detailed in Section 3.6. Critical areas have specific stormwater analysis guidelines, requiring the use of certain pollution prevention measures and BMPs to the maximum extent practicable for redevelopment projects.

1.3 Proposed Project Work

The proposed project consists of paving the approximately 0.5-acre gravel parking area in the southern portion of the site, renovation of the existing bathhouse and concessions building, installation of new ADA-accessible concrete pathways, lifeguard stands, picnic tables, a playground, multi-use court, boat launch, check-in shelter, and several other surficial Site improvements. Construction activities are expected to begin in March 2021 and end in November 2021.

2. STORMWATER EVALUATION

2.1 Stormwater Modeling Methodology

TR-55/TR-20 methodology was used to develop a hydrologic model of the site. Woodard & Curran used the computer program entitled HydroCAD Version 10.0, developed by HydroCAD Software Solutions, LLC in order to create and analyze the site hydrology. The analysis was conducted in order to establish the peak rates of runoff and estimated runoff volume from the project site. This was accomplished to evaluate pre- and post-development conditions during various storm events. Contributing drainage areas were identified and soils, surface cover, watershed slope, and flow paths were evaluated to develop the necessary HydroCAD model input parameters. A minimum Time of Concentration (Tc) of 6 minutes was used in the calculations, as applicable.

Drainage calculations were performed for the pre- and post-development conditions for the 1-, 2-, 10-, 25-, and 100-year 24-hour Type III storm events, and are included in **Appendix D**, in accordance with the Town of Arlington's, Town of Lexington's, and the Massachusetts Department of Environmental Protection's Stormwater Management Regulations. The total rainfall for each of the storm events was based upon data published by the Northeast Regional Climate Center (NRCC) and Natural Resources Conservation Service (NRCS) entitled *Extreme Precipitation in New York and New England* found at http://precip.eas.cornell.edu/. The total precipitation depth for the project site associated with each rainfall event is outlined in **Table 2-1**, below.

Table 2-1: Design Rainfall Data

Type III 24-Hour Storm Event (Frequency)	Rainfall Depth (Inches)
1-Year	2.67
2-Year	3.21
10-Year	4.86
25-Year	6.17
100-Year	8.85

A copy of the NRCC and NRCS Extreme Precipitation Table for the project Site is included in **Appendix A**.

In addition to the above analysis, this site was also evaluated using National Oceanic and Atmospheric Administration (NOAA) Atlas plus rainfall depth and distribution data. Discussion and a summary of results for this additional analysis can be found in **Section 2.4** and model result data can also be found in **Appendix D**

2.2 Hydraulic Model Description

A stormwater model has been developed to compare the peak runoff rates from the pre-development site to the peak runoff rates anticipated from the post-development site. As further described herein, the model demonstrates that the post-development runoff rates will not exceed pre-development rates.

2.2.1 Design Points

Existing and proposed subcatchments were delineated in order to compare pre- and post-development peak rates of runoff. Although the size of each subcatchment differs slightly between the existing and proposed site conditions, the total area analyzed between the two conditions remained the same. A Design Point was established for each

watershed, symbolizing the area's ultimate stormwater discharge location. For this analysis, two watershed areas were identified, and therefore two Design Points were chosen, as follows:

- Design Point 1 (DP-1): represents runoff discharging to the Arlington Reservoir and Swimming Area.
- Design Point 2 (DP-2): represents runoff discharging to the ditch located north of the property at 202 Lowell Street.

The locations of the Design Points do not differ in the pre- and post-development analyses, as seen in the figures located in **Appendix C**.

2.2.2 Pre-Development Conditions

The pre-development project area consists of a swimming area, sandy beach, bathhouse, vending machines, concession area, playground, pump station building, walking paths, benches, lifeguard stands, a 0.5-acre gravel parking lot, a small paved parking lot, and various other Site features. Existing grassed areas on-Site were modeled to be in "fair" condition, as much of the grassed surfaces are currently covered in beach sand and therefore are not likely infiltrating groundwater as efficiently as grass in "good" condition would be.

Per Article 15 – Storm Water Mitigation of the Town of Arlington's Title V – Regulations Upon the Use of Private Property Bylaws, impervious surfaces are defined as "a hard-surfaced, human-made area that does not readily absorb or retain water, preventing the infiltration of storm water runoff; including but not limited to…parking and driveway areas…" Upon review of existing conditions at the site, it appears the 0.5-acre gravel parking lot on the southern half of the Site exhibits the hydrologic characteristics one would expect with an impervious surface. Ponded water has been observed on the gravel surface several days after rain events due to its inability to infiltrate to the soil below. Based on this review and Article 15 of the Town of Arlington's Title V Bylaws, the gravel parking area has been considered impervious for the purposes of this stormwater analysis.

The pre-development watershed area is approximately 5.42 acres in size. There are no existing stormwater BMPs on-Site; stormwater runoff from the three subcatchments within the project area is conveyed via overland flow to their respective design points, as described below:

- *Subcatchment 1:* Subcatchment 1 encompasses the northern portion of the Site, including the playground, beach, and parking lots. Stormwater runoff from subcatchment 1 flows via overland flow from east to west before discharging into the Arlington Reservoir and Swimming Area (DP-1), which is classified by MassDEP as a critical area. The area is approximately 5.22 acres in size; land cover is primarily comprised of grass, beach sand, surface water, and impervious gravel with smaller areas of brush, impervious structures, and sand pathways. The calculated weighted curve number for this subcatchment is 71.
- *Subcatchment 2:* Subcatchment 2 encompasses the southern-most portion of the 0.5-acre gravel parking area. Stormwater runoff from subcatchment 3 flows via overland flow from north to south before discharging into the ditch just north of the property at 202 Lowell Street (DP-2). The area is approximately 0.20 acre in size; land cover is primarily comprised of impervious gravel, grass, and brush, with smaller areas of impervious surfaces. The calculated weighted curve number for this subcatchment is 64.

The subcatchment areas and their associated design points are illustrated on the Pre-Development Watershed Figure provided in **Appendix C** of this Report.

2.2.3 Post-Development Conditions

The post-development project area will consist of a swimming area, sandy beach, renovated bathhouse, vending machine, and concession area, a newly-paved picnic pavilion and drop-off area, a new check-in area, permeable multi-surface athletic court, playground, lifeguard stands, walking paths, restored grass areas, 21,500 square-foot porous pavement parking lot, and various other Site features. The new walking paths around the project area will be ADA-accessible and will allow increased Site access not currently provided in the Site's existing condition. The porous pavement parking lot is described in further detail in Section 2.2.4.

Similar to the pre-development model, the post-development watershed area is also 5.42 acres in size. Stormwater runoff from the two subcatchments will flow to its respective design points, as described below:

- *Subcatchment 1:* Subcatchment 1 will encompass the northern portion of the Site, including the playground, beach, and parking lots. Stormwater runoff from subcatchment 1 will flow via overland flow from east to west before either discharging directly into Arlington Reservoir and Swimming Area (DP-1) or into the porous pavement system proposed for installation over the Site's southern parking area. Stormwater entering the porous pavement system will either infiltrate into the ground or, during large storm events, will be collected by the system's underdrain and discharged towards Arlington Reservoir. The subcatchment area will be approximately 5.32 acres in size; land cover will be primarily comprised of grass, surface water, beach sand, porous asphalt pavement, and various impervious surfaces (including standard asphalt pavement, concrete walkways, and structures), with smaller areas of brush, permeable playground and athletic court surfaces, and stone dust. The calculated weighted curve number for this subcatchment is 69.

- *Subcatchment 2:* Subcatchment 2 will encompass the area south of the porous pavement parking area. Stormwater runoff from subcatchment 2 will flow via overland flow from north to south before discharging into the ditch just north of the property at 202 Lowell Street (DP-2). The area will be approximately 0.10 acre in size; land cover will be entirely comprised of grass. The calculated weighted curve number for this subcatchment is 39.

The subcatchment areas and their associated design points are illustrated on the Post-Development Watershed Figure provided in **Appendix D** of this Report.

2.2.4 Low Impact Development Technique – Porous Pavement

Porous pavement was selected as a Low Impact Development (LID) technique for this Site in accordance with the Arlington Reservoir Master Plan written by Weston & Sampson in 2018. The proposed 21,500 square-foot porous pavement parking lot will replace the existing impervious gravel lot, which will provide a stabilized parking area and minimize the amount of maintenance required to upkeep the parking lot and reduce the amount sediment transported into Arlington Reservoir during post-construction conditions. Stormwater directed to the porous pavement will filter through the system's asphalt, choker, and pea gravel courses and enter the reservoir course, designed to provide storage capacity while stormwater infiltrates into the soils beneath the system. The bottom of the reservoir course was designed at elevation 161.40, providing a 2-foot separation from the highest seasonal high groundwater table elevation observed during test pitting activities conducted at the Site. A four-inch PVC underdrain and three grate inlets will be installed within the western-most portion of the system's reservoir course to provide an outlet for stormwater during extreme storm events. The invert of these outlets was designed at the 100-year storm elevation within the porous pavement BMP, meaning rainfall greater than the 100-year storm will flow through the reservoir course of the pavement system to the PVC underdrain and grate inlets and will discharge to the Arlington Reservoir (DP-1).

Volume 1, Chapter 1 of the Massachusetts Stormwater Handbook does not list porous pavement as an approved stormwater BMP for discharges near bathing beaches and Volume 2, Chapter 2 of the Handbook states that porous

pavement shall be set back at least 100 feet from surface waters to receive any water quality credit. Existing Site constraints, including the lack of available area to install stormwater BMPs and the proximity to surface water across the entire project area, inhibit the use of many typical BMPs. Although porous pavement is not a listed BMP for bathing beaches, its use can be implemented within the project area and it will improve stormwater treatment at the Site by increasing water quality volume, annual recharge, and removal of total suspended solids (TSS) in the post-development Site condition.

2.3 Peak Discharge Rates and Runoff Volumes

The tables below summarize the pre- and post-development peak discharge rates and runoff volumes for each Design Point.

Table 2-2: Pre- and Post-Development Peak Discharge Rates

Design Point	1-year (cfs)			2-year (cfs)			10-year (cfs)			25-year (cfs)			100-year (cfs)		
	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ
DP-1	2.96	1.65	**-1.31**	4.93	3.15	**-1.78**	12.11	8.92	**-3.19**	18.53	14.29	**-4.24**	32.53	26.30	**-6.23**
DP-2	0.04	0.00	**-0.04**	0.10	0.00	**-0.10**	0.33	0.00	**-0.33**	0.54	0.02	**-0.52**	1.04	0.13	**-0.91**

Note: Δ stands for net difference between the pre- and post-development rates.

Table 2-3: Pre- and Post-Development Runoff Volumes

Design Point	1-year (af)			2-year (af)			10-year (af)			25-year (af)			100-year (af)		
	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ
DP-1	0.25	0.17	**-0.08**	0.38	0.27	**-0.11**	0.87	0.66	**-0.21**	1.32	1.03	**-0.29**	2.32	1.87	**-0.45**
DP-2	0.00	0.00	**0.00**	0.00	0.00	**0.00**	0.03	0.00	**-0.03**	0.04	0.00	**-0.04**	0.07	0.01	**-0.06**

Note: Δ stands for net difference between the pre- and post-development volumes.

Table 2-2 demonstrates a decrease in peak discharge rates between the existing and proposed site conditions for all scenarios shown above; **Table 2-3** demonstrates a decrease in runoff volumes between the existing and proposed site conditions for all scenarios shown above. Complete copies of the pre- and post-development HydroCAD computer model outputs demonstrating that peak discharge rates and runoff volumes decrease between the existing and proposed Site conditions are included in **Appendix D**.

2.4 NOAA Atlas 14 Plus Evaluation

Currently, the Massachusetts Department of Environmental Protection (MassDEP) is considering changing their current regulations to specify the use of NOAA Atlas 14 Plus data for use in stormwater modeling. Overall the modeling methodology will stay the same as described in Section 4.1, but updated rainfall depths and distribution curves have been established in order to better capture the effect of climate change along with the addition of several years of new data. The rainfall totals are calculated by multiplying the Upper Confidence of the standard NOAA Atlas 14 precipitation frequency estimates by 0.9. Rainfall depths used in this analysis can be found below in **Table 2-4**. In addition to the rainfall depths, NOAA guidelines stipulate the use of rainfall distributions curves created by the NRCS Water Quality and Quantity Development Team. These curves are based on geographic area and specifies the use of rainfall distribution curve “D” for areas in Arlington and Lexington, MA. Results of the NOAA Atlas 14 Plus analysis can be found below in **Table 2-5**.

Table 2-4: Design Rainfall Data

NOAA 24-Hour Storm Event (Frequency)	Rainfall Depth (Inches)
1-Year	2.93
2-Year	3.64
10-Year	5.79
25-Year	7.48
100-Year	10.35

Table 2-5: NOAA Atlas 14 Plus Results

Rainfall Event	DP-1			DP-2		
	Pre(cfs)	Post(cfs)	∆	Pre(cfs)	Post(cfs)	∆
1	3.86	2.38	**-1.48**	0.07	0.00	**-0.07**
2	6.51	4.47	**-2.04**	0.15	0.00	**-0.15**
10	15.91	12.22	**-3.69**	0.46	0.01	**-0.45**
25	24.00	19.13	**-4.87**	0.75	0.06	**-0.69**
100	38.24	31.54	**-6.70**	1.27	0.21	**-1.06**

As can be seen in **Table 2-5**, the results from the NOAA Atlas 14 Plus analysis closely mirror those of the previous NRCC Extreme Precipitation results. Furthermore, the analysis does not give any reason for concern about the stormwater system due to the larger rainfall depths calculated from the NOAA data. While the total rainfall depths are significantly different, especially seen during large events, the rainfall distributions used with the NOAA data create similar peak flowrates as seen with NRCC Extreme Precipitation data used with a Soil Conservation Service (SCS) Type III rainfall distribution.

3. COMPLIANCE WITH STORMWATER MANAGEMENT STANDARDS

Volume 1, Chapter 1 of the Massachusetts Stormwater Handbook states:

> *"For purposes of the Stormwater Management Standards, redevelopment projects are defined to include…maintenance and improvement of existing roadways, including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving."*

By this definition, the Arlington Reservoir Phase 2 project is considered a redevelopment project, meaning certain Standards included in the Massachusetts Stormwater Handbook only need to be met to the maximum extent practicable (as defined by Standard 7). The following sections further detail applicability of these Stormwater Management Standards and demonstrates that the proposed Arlington Reservoir – Phase 2 Project complies with these requirements.

3.1 Standard 1: No New Untreated Discharges

"No new stormwater conveyances (e.g. outfalls) will discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth."

In the existing site condition, stormwater is generally transported via overland flow towards the Arlington Reservoir and Swimming Area (DP-1) and the ditch just north of the property at 202 Lowell Street (DP-2). Runoff from the project area is not currently treated prior to discharge. The proposed site improvements will not create any new untreated stormwater discharges and will result in a net decrease in impervious area of approximately 18,000 square feet. Stormwater runoff from Site will be either conveyed via overland flow to Design Points, similar to existing condition drainage patterns, or will be treated by a new porous pavement system prior to infiltrating into the ground or, during extreme storms greater than the 100-year event, discharging into the Arlington Reservoir (DP-1) after filter treatment. There are no proposed untreated stormwater discharges that will cause erosion in or to wetlands or waters of the Commonwealth. This Standard has been met.

3.2 Standard 2: Peak Rate Attenuation

"Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates."

Calculations are provided to show that the post-development peak discharge rates do not exceed pre-development rates for the 1-, 2-, 10-, 25-, and 100-year 24-hour storm events. A detailed description of both the existing and proposed Site conditions are located in Section 2.2 of this report. Copies of the existing and proposed HydroCAD computer model outputs demonstrating that this standard has been met are included in **Appendix D**.

3.3 Standard 3: Recharge

"Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This condition is met when the stormwater management system is designed to infiltrate the required volume as determined in accordance with the Massachusetts Stormwater Handbook."

The proposed improvements will decrease the amount of impervious area across the project Site by approximately 18,000 square feet. No additional groundwater recharge volume is required, however, installation of porous pavement over the existing gravel parking lot in the southern portion of the Site and restoration of grass areas throughout the Site

are proposed as part of this project. The porous pavement and restored grass areas will increase stormwater infiltration, and therefore annual recharge, in the post-development Site condition.

3.4 Standard 4: Water Quality

"Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when: (a) Suitable practices for source control and pollution prevention are identified in long-term pollution prevention plan, and thereafter implemented and maintained; (b) Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and (c) Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook."

Existing Site conditions provide 0% TSS removal. The Town of Arlington is proposing to install a porous pavement system over the existing gravel parking lot in the southern portion of the Site. The system will increase water quality volume and remove TSS from the stormwater runoff produced from the proposed parking lot area and the adjacent grass area to the east sloping downward from Lowell Street in the post-development Site condition. During storm events, stormwater will filter through the porous pavement system's asphalt, choker, and pea gravel courses and enter the reservoir course, designed to provide storage capacity while stormwater infiltrates into the soils beneath the system.

According to Volume 2, Chapter 2 of the Massachusetts Stormwater Handbook, porous pavement systems can remove up to 80% of TSS if the reservoir course is designed to hold the Site's required water quality volume and to drain within 72 hours of a storm event. The proposed Site improvements will decrease the amount of impervious area across the project Site by approximately 18,000 square feet, and therefore no additional water quality volume is required on-Site. However, the porous pavement system's reservoir course has been designed to store the 100-year storm event and to drain within 26 hours of the 100-year event. Therefore, it can be assumed that the proposed porous pavement system will remove up to 80% of the TSS in stormwater runoff discharging to the system. On other parts of the proposed project Site, this Standard is met to the maximum extent practicable by not creating any new untreated stormwater discharges.

An Operations and Maintenance Plan is provided in **Appendix E**, which specifies suitable practices for source control and long-term pollution prevention.

3.5 Standard 5: Land Uses with Higher Potential Pollutant Loads

"For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook."

The proposed project is not considered a Land Use with Higher Potential Pollutant Loads; therefore, this standard does not apply.

3.6 Standard 6: Critical Areas

"Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply and stormwater discharges near or to any other critical area require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas as provided in the Massachusetts Stormwater Handbook."

Per the Massachusetts Stormwater Handbook, the Arlington Reservoir and associated Swimming Area on the eastern shore of the Reservoir are classified as critical areas. These surface water features are described throughout this report as DP-1 and will receive stormwater discharges from subcatchment 1 in the post-development Site condition. Critical areas have specific stormwater analysis guidelines, requiring the use of certain pollution prevention measures and BMPs to the maximum extent practicable for redevelopment projects. Compliance with these guidelines is discussed below:

- Standard 6 requires BMP trains discharging to critical areas to remove 80% of TSS prior to discharge. There are no existing stormwater BMPs located in subcatchment 1. In the proposed Site condition, the majority of stormwater runoff from subcatchment 1 will travel, via overland flow, to the Reservoir and Swimming Area by passing over grassed areas and beach sand prior to discharging into DP-1. This stormwater runoff will not be treated by a stormwater BMP, similar to existing Site conditions. Stormwater runoff produced from the proposed porous parking lot area and the adjacent grass area to the east sloping downward from Lowell Street will filter through the porous pavement system, during which 80% of TSS will be removed.

- A water quality depth of one-inch (1”) must be used for water quality volume calculations in critical areas. The proposed Site improvements will decrease the amount of impervious area across the project Site by approximately 18,000 square feet, and therefore no additional water quality volume is required on-Site.

The proposed Site improvements meet this Standard to the maximum extent practicable.

3.7 Standard 7: Redevelopment

“A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5 and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.”

The proposed project is considered a redevelopment project and will decrease the overall impervious area on Site by approximately 18,000 square feet. The proposed work fully complies with Stormwater Management Standards 1, 2, 3, 5, 8, 9, and 10, and complies, to the maximum extent practicable, with Standards 4 and 6 as described herein.

3.8 Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

“A plan to control construction related impacts including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.”

A plan to control construction-related impacts, specifically erosion and sedimentation, has been developed and is included in **Appendix F**. The proposed project has been designed to minimize land disturbance and preserve existing vegetation to the maximum extent practicable. The proposed construction BMPs have been designed in accordance with Massachusetts Erosion and Sediment Control BMPs Handbook published by MassDEP.

The Contractor will be responsible for implementing the specified erosion and sedimentation control methods. These measures will be maintained and kept in place until the disturbed areas of the project have fully stabilized. In addition, a U.S. Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Construction General Permit is required whenever construction activities will disturb one or more acres; the proposed project will disturb approximately 5.42 acres.

3.9 Standard 9: Operation and Maintenance Plan

"A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed."

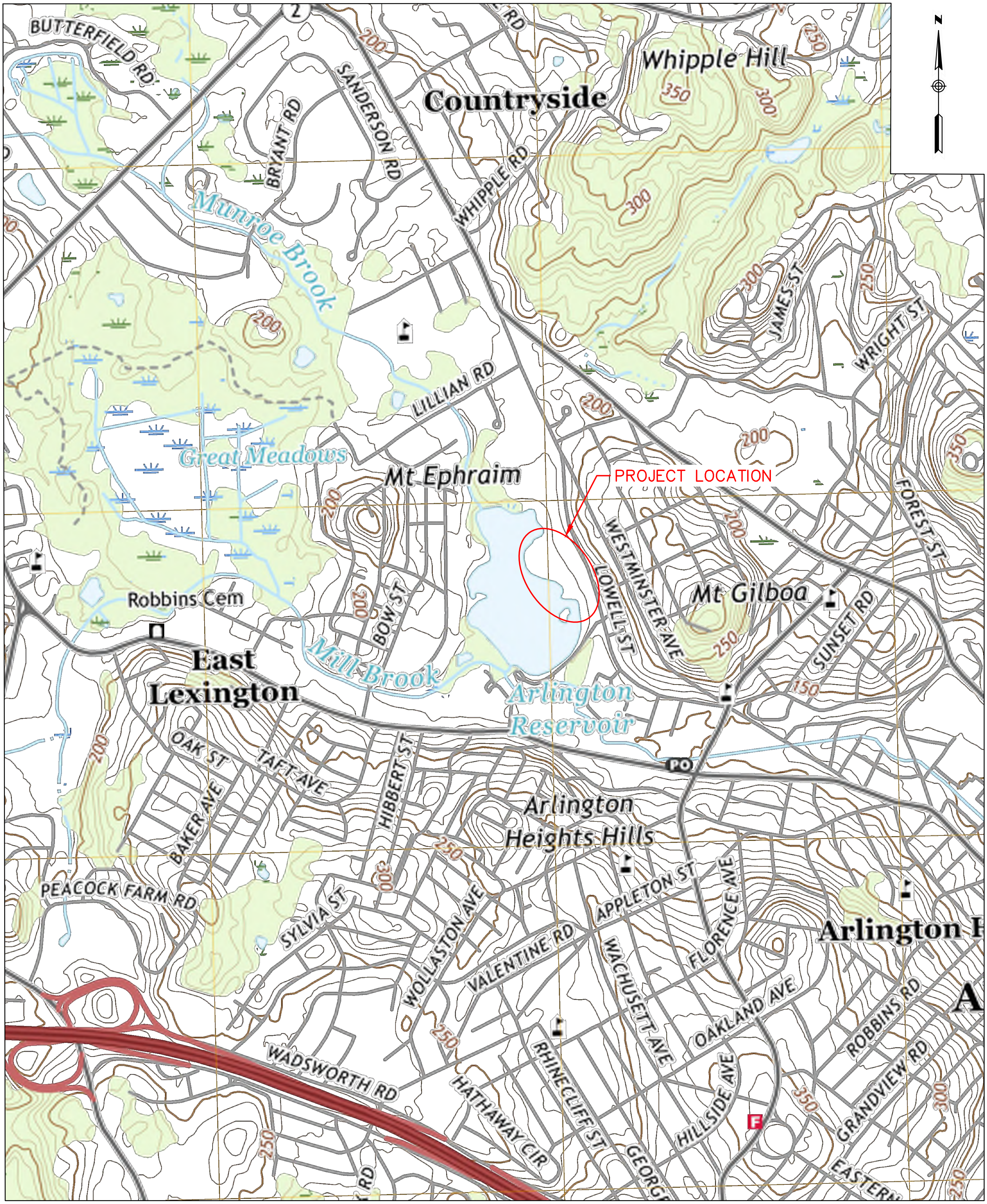
A long-term Operation and Maintenance Plan is included in **Appendix E** of this report.

3.10 Standard 10: Prohibition of Illicit Discharges

Standard 10 states that "All illicit discharges to the stormwater management system are prohibited."

The project will not result in any new illicit discharges. An Illicit Discharge Compliance Statement will be submitted prior to construction.

APPENDIX A: ENVIRONMENTAL RESOURCE DOCUMENTATION



NOTES:

1. BASE MAP TAKEN FROM UNITED STATES GEOLOGICAL SERVICES, DATED 2018. ACCESSED ON SEPTEMBER 15, 2020.

WOODARD & CURRAN

40 Shattuck Road, Suite 110
Andover, Massachusetts 01810
866.702.6371 | www.woodardcurran.com

COMMITMENT & INTEGRITY DRIVE RESULTS

ARLINGTON RESERVOIR PHASE 2
LOCUS MAP

DESIGNED BY: LLT | CHECKED BY: BSM
DRAWN BY: LLT | 2020.09.15 LOCUS MAP.dwg

TOWN OF ARLINGTON, MA
51 GROVE STREET
ARLINGTON, MA 02476

ARLINGTON RESERVOIR
210 LOWELL ST, ARLINGTON, MA

JOB NO: 0233115.00
DATE: SEPTEMBER 2020
SCALE: N.T.S.

FIGURE 1

\\woodardcurran.net\shared\Projects\0233115.00 KZLA Architects - Arlington Reservoir Phase 2\wip\Drawings\Figures\2020.09.15 Locus Map.dwg, Sep 15, 2020 - 3:00pm LTOBEY

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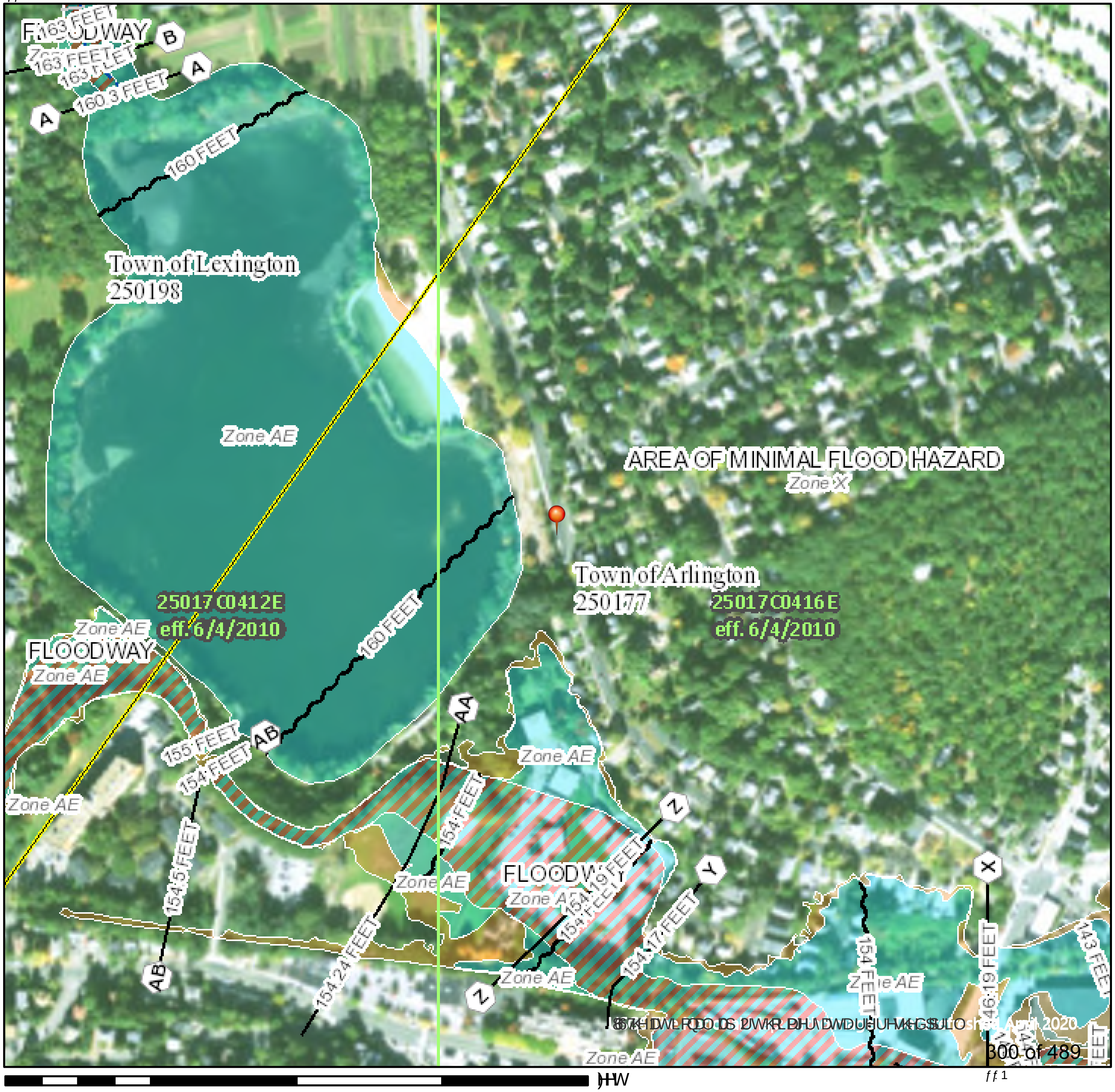
FEMA



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5HJXODWRU\ )ORRGZD\

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)XWXUH &RQGLWLRQV $QQXDO &KDQFH)ORRG +D]DUG =RQH ;
$UHD ZLWK 5HGXFHG)ORRG 5LVN GXH WR /HYHH 6HH 1RWHV =RQH ;
$UHD ZLWK)ORRG 5LVN GXH WR /HYHH =RQH '

27+(5 $5($6

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(IIHFWLYH /20V
$UHD RI 8QGHWHUPLQHG)ORRG +D]DUG =RQH '

*(1(5$/ 6758&785(6

&KDQQHO &XOYHUW RU 6WRUP 6HZHU
/HYHH 'LNH RU)ORRGZDOO

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:DWHU 6XUIDFH (OHYDWLRQ
&RDVWDO 7UDQVHFW
%DVH)ORRG (OHYDWLRQ /LQH %)(
/LPLW RI 6WXG\
-XULVGLFWLRQ %RXQGDU\
&RDVWDO 7UDQVHFW %DVHOLQH
3URILOH %DVHOLQH
+\GURJUDSKLF)HDWXUH

0$3 3$1(/6

'LJLWDO 'DWD $YDLODEOH
1R 'LJLWDO 'DWD $YDLODEOH
8QPDSSHG

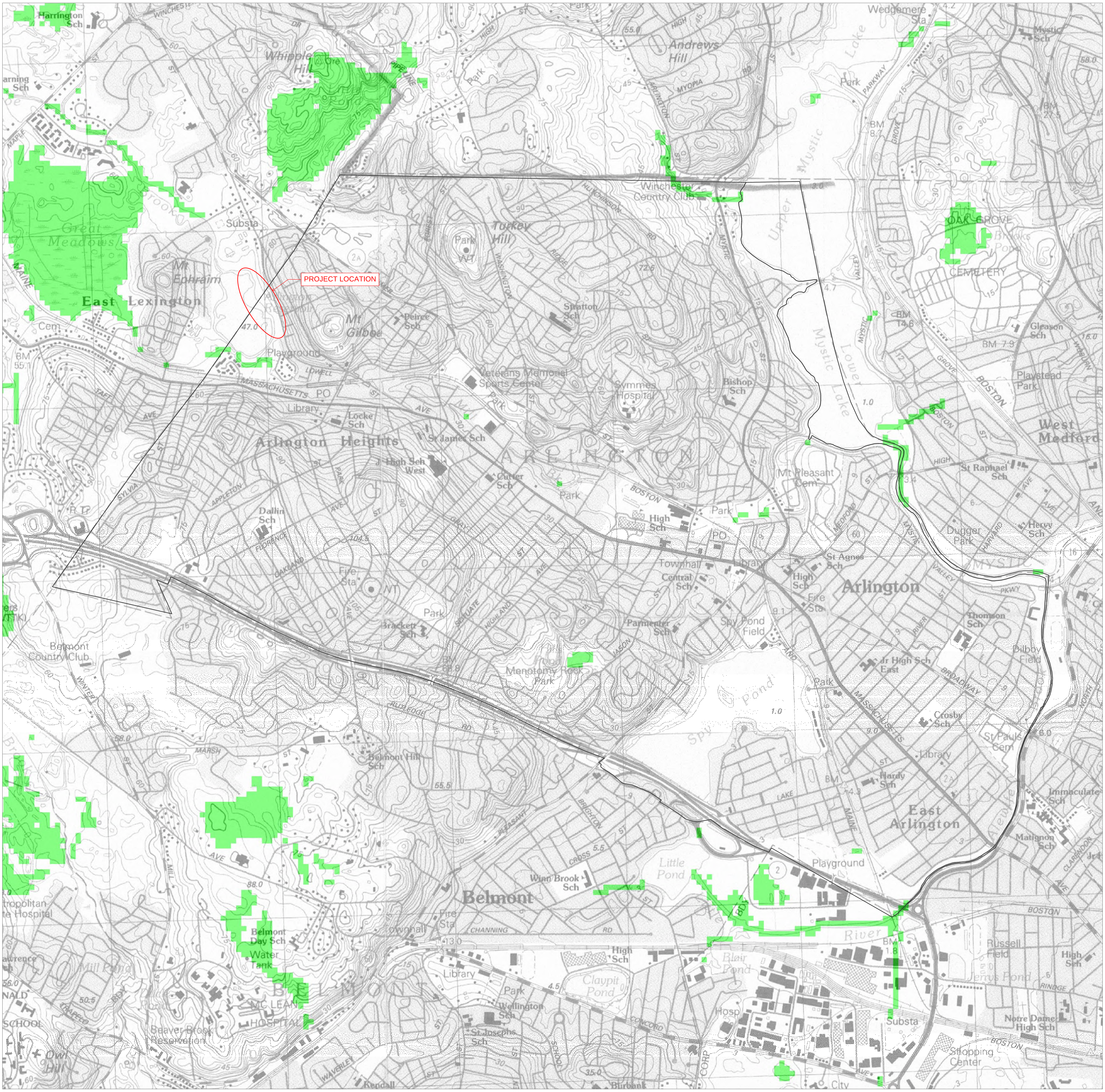
7KH SLQ GLVSOD\HG RQ WKH PDS LV DQ DSSUR[LPDWH SRLQW VHOHFWHG E\ WKH XVHU DQG GRHV QRW UHSUHVHQW DQ DXWKRULWDWLYH SURSHUW\ ORFDWLRQ

7KLV PDS FRPSOLHV ZLWK)(0$
V VWDQGDUGV IRU WKH XVH RI GLJLWDO IORRG PDSV LI LW LV QRW YRLG DV GHVFULEHG EHORZ 7KH EDVHPDS VKRZQ FRPSOLHV ZLWK)(0$
V EDVHPDS DFFXUDF\ VWDQGDUGV

7KH IORRG KD]DUG LQIRUPDWLRQ LV GHULYHG GLUHFWO\ IURP WKH DXWKRULWDWLYH 1)+/ ZHE VHUYLFHV SURYLGHG E\ )(0$ 7KLV PDS ZDV H[SRUWHG RQ DW 30 DQG GRHV QRW UHIOHFW FKDQJHV RU DPHQGPHQWV VXEVHTXHQW WR WKLV GDWH DQG WLPH 7KH 1)+/ DQG HIIHFWLYH LQIRUPDWLRQ PD\ FKDQJH RU EHFRPH VXSHUVHGHG E\ QHZ GDWD RYHU WLPH

7KLV PDS LPDJH LV YRLG LI WKH RQH RU PRUH RI WKH IROORZLQJ PDS HOHPHQWV GR QRW DSSHDU EDVHPDS LPDJHU\ IORRG]RQH ODEHOV OHJHQG VFDOH EDU PDS FUHDWLRQ GDWH FRPPXQLW\ LGHQWLILHUV)53 SDQHO QXPEHU DQG)53 HIIHFWLYH GDWH 0DS LPDJHV IRU XQPDSSHG DQG XQPRGHUQL]HG DUHDV FDQQRW EH XVHG IRU UHJXODWRU\ SXUSRVHV

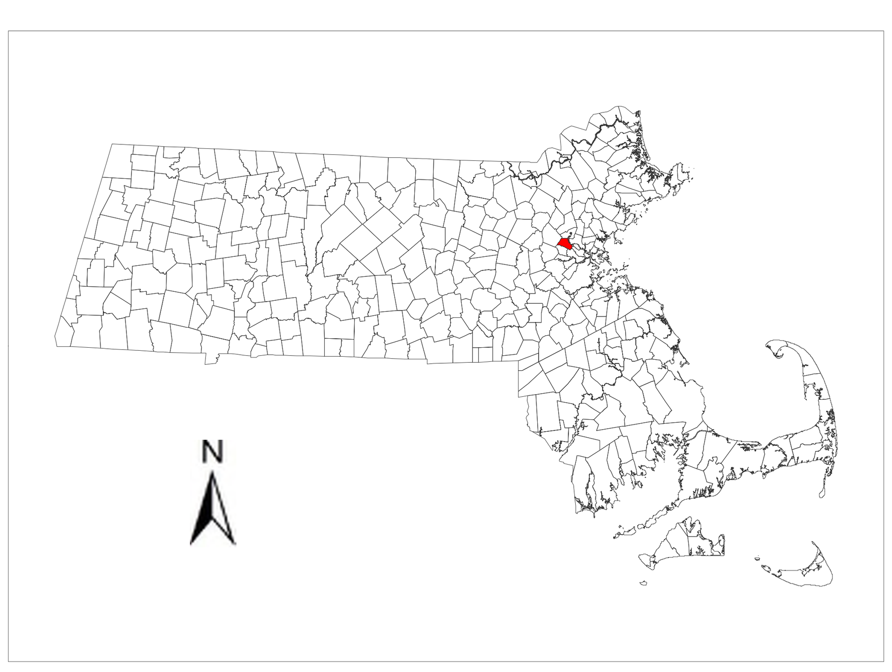
Habitat of Potential Regional or Statewide Importance
Town of ARLINGTON, MA



0 0.5 1 2 Miles

Important Wildlife Habitat

Updated November 2011



The MassDEP's Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands, June 2006 adopted a new approach for assessing wildlife habitat impacts associated with work in wetlands. This approach utilizes maps developed at the University of Massachusetts Amherst using the Conservation Assessment and Prioritization System (CAPS). The maps depict "Habitat of Potential Regional or Statewide Importance" that may trigger more intensive levels of review. For more information on how to assess wildlife habitat impacts, see Section III of the Guidance document: http://www.mass.gov/dep/water/laws/wldhab.pdf.

The CAPS model assesses the ecological integrity of Massachusetts landscape features as influenced by environmental stressor metrics (e.g. pollution, fragmentation). CAPS relies on data that are broadly available across Massachusetts. Ecological features which are not consistently surveyed or uniformly available, such as certified vernal pools, rare species, and contamination sites are not included in CAPS. When available, this more specific ecological information may be used in conjunction with the CAPS outputs to better understand particular sites in Massachusetts and support informed conservation decision-making. For more information on the statewide maps produced by the CAPS model, see: http://www.masscaps.org.

These maps are funded in part by the Massachusetts Executive Office of Energy and Environmental Affairs, the Massachusetts Department of Environmental Protection and the U.S. Environmental Protection Agency under section 104 (b)(3) of the U.S. Clean Water Act. Environmental data sources include the Office of Geographic and Environmental Information (MassGIS).

MassDEP

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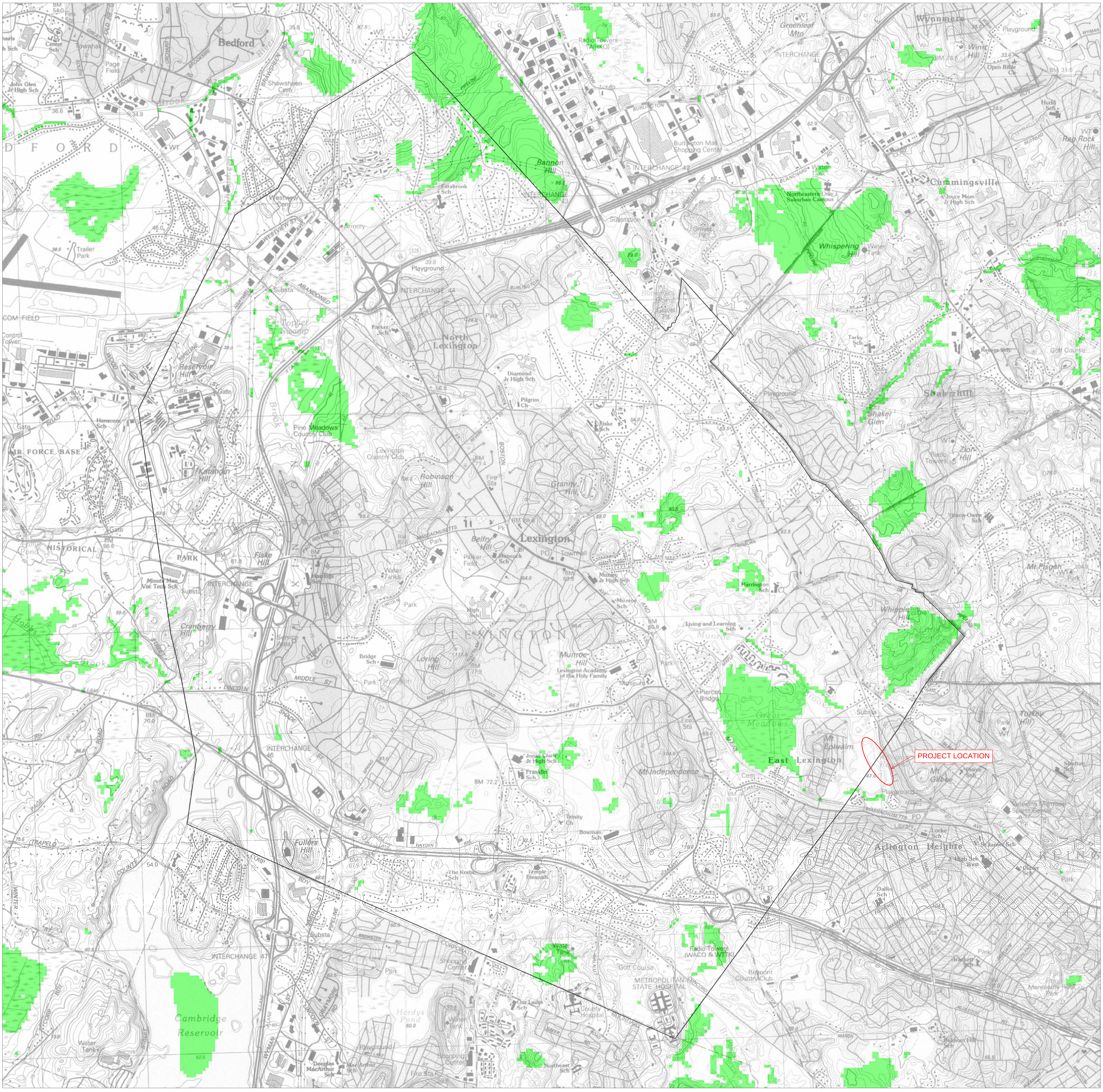
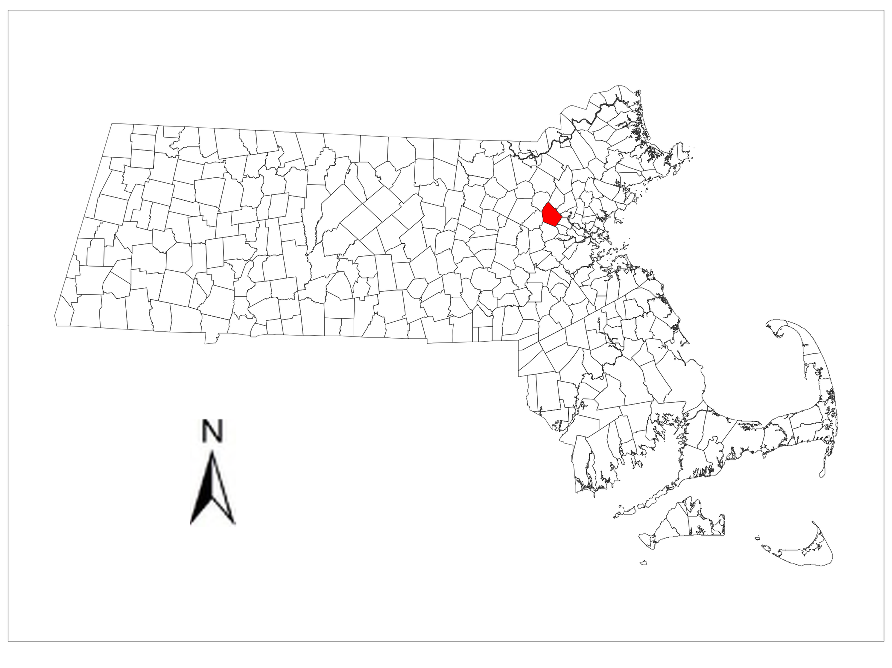
Habitat of Potential Regional or Statewide Importance
Town of LEXINGTON, MA



0 0.5 1 2 Miles

Important Wildlife Habitat

Updated November 2011



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MassDEP

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CENTER FOR AGRICULTURE

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	Massachusetts
Location	
Longitude	71.187 degrees West
Latitude	42.428 degrees North
Elevation	0 feet
Date/Time	Thu, 10 Sep 2020 11:23:56 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.70	0.87	1.10	**1yr**	0.75	1.04	1.28	1.63	2.08	2.67	2.90	**1yr**	2.36	2.79	3.26	3.95	4.62	**1yr**
2yr	0.35	0.53	0.67	0.88	1.10	1.39	**2yr**	0.95	1.28	1.61	2.03	2.55	3.21	3.56	**2yr**	2.84	3.42	3.92	4.66	5.31	**2yr**
5yr	0.41	0.64	0.81	1.08	1.38	1.76	**5yr**	1.19	1.60	2.05	2.58	3.24	4.07	4.53	**5yr**	3.60	4.35	4.97	5.93	6.65	**5yr**
10yr	0.47	0.73	0.93	1.26	1.64	2.10	**10yr**	1.41	1.90	2.45	3.10	3.89	4.86	5.43	**10yr**	4.31	5.22	5.95	7.11	7.88	**10yr**
25yr	0.56	0.88	1.12	1.55	2.05	2.66	**25yr**	1.77	2.39	3.11	3.94	4.95	6.17	6.92	**25yr**	5.46	6.66	7.55	9.05	9.87	**25yr**
50yr	0.62	1.00	1.29	1.81	2.43	3.19	**50yr**	2.10	2.84	3.75	4.75	5.95	7.39	8.32	**50yr**	6.54	8.00	9.04	10.87	11.71	**50yr**
100yr	0.72	1.17	1.50	2.13	2.89	3.81	**100yr**	2.50	3.37	4.48	5.69	7.13	8.85	10.00	**100yr**	7.83	9.62	10.84	13.05	13.90	**100yr**
200yr	0.82	1.34	1.74	2.49	3.44	4.56	**200yr**	2.97	4.01	5.38	6.84	8.57	10.61	12.04	**200yr**	9.39	11.57	12.99	15.68	16.50	**200yr**
500yr	1.00	1.64	2.13	3.09	4.33	5.78	**500yr**	3.74	5.05	6.85	8.72	10.91	13.49	15.38	**500yr**	11.94	14.79	16.51	20.00	20.71	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.37	0.46	0.62	0.76	0.84	1yr	0.65	0.82	1.14	1.43	1.76	2.39	2.46	1yr	2.12	2.37	2.89	3.50	4.01	1yr
2yr	0.33	0.51	0.63	0.85	1.05	1.25	2yr	0.90	1.23	1.44	1.90	2.46	3.10	3.43	2yr	2.74	3.30	3.78	4.49	5.14	2yr
5yr	0.39	0.60	0.74	1.02	1.29	1.50	5yr	1.12	1.46	1.72	2.23	2.87	3.73	4.13	5yr	3.30	3.97	4.54	5.42	6.11	5yr
10yr	0.43	0.66	0.82	1.15	1.48	1.71	10yr	1.28	1.67	1.93	2.51	3.22	4.29	4.76	10yr	3.80	4.58	5.22	6.21	6.96	10yr
25yr	0.50	0.76	0.94	1.34	1.77	2.03	25yr	1.53	1.98	2.28	2.95	3.75	5.14	5.73	25yr	4.55	5.51	6.26	7.40	8.25	25yr
50yr	0.55	0.84	1.04	1.50	2.02	2.32	50yr	1.74	2.27	2.57	3.33	4.22	5.89	6.57	50yr	5.21	6.32	7.18	8.42	9.37	50yr
100yr	0.61	0.93	1.16	1.68	2.30	2.64	100yr	1.99	2.58	2.91	3.58	4.74	6.77	7.54	100yr	5.99	7.25	8.24	9.55	10.65	100yr
200yr	0.69	1.04	1.31	1.90	2.65	3.01	200yr	2.29	2.94	3.30	4.00	5.35	7.76	8.65	200yr	6.87	8.32	9.45	10.81	12.08	200yr
500yr	0.80	1.19	1.54	2.23	3.17	3.58	500yr	2.74	3.50	3.88	4.63	6.27	9.30	10.35	500yr	8.23	9.95	11.33	12.69	14.28	500yr

Upper Confidence Limits

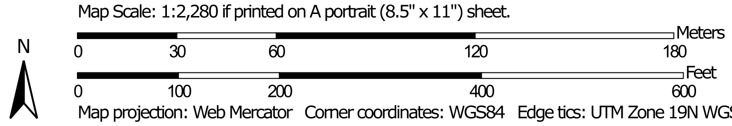
	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.31	0.48	0.59	0.79	0.97	1.13	1yr	0.84	1.11	1.32	1.76	2.24	2.86	3.14	1yr	2.53	3.02	3.50	4.29	5.02	1yr
2yr	0.36	0.56	0.69	0.93	1.15	1.35	2yr	0.99	1.32	1.56	2.06	2.66	3.34	3.71	2yr	2.96	3.57	4.09	4.86	5.52	2yr
5yr	0.45	0.69	0.86	1.18	1.50	1.78	5yr	1.30	1.74	2.04	2.63	3.35	4.43	4.98	5yr	3.92	4.79	5.42	6.45	7.20	5yr
10yr	0.54	0.84	1.04	1.45	1.87	2.19	10yr	1.62	2.14	2.54	3.19	4.02	5.51	6.24	10yr	4.88	6.00	6.73	8.03	8.82	10yr
25yr	0.71	1.07	1.34	1.91	2.51	2.88	25yr	2.17	2.82	3.36	4.11	5.11	7.32	8.42	25yr	6.48	8.09	8.97	10.76	11.55	25yr
50yr	0.85	1.30	1.62	2.33	3.13	3.56	50yr	2.70	3.48	4.16	4.99	6.13	9.11	10.57	50yr	8.06	10.16	11.13	13.44	14.18	50yr
100yr	1.04	1.58	1.98	2.85	3.92	4.39	100yr	3.38	4.29	5.16	6.33	7.35	11.32	13.28	100yr	10.02	12.77	13.82	16.82	17.43	100yr
200yr	1.27	1.91	2.42	3.51	4.89	5.41	200yr	4.22	5.29	6.41	7.73	8.81	14.10	16.70	200yr	12.48	16.06	17.18	21.05	21.44	200yr
500yr	1.65	2.46	3.17	4.60	6.54	7.13	500yr	5.64	6.97	8.53	10.08	11.21	18.85	22.64	500yr	16.68	21.77	22.89	28.39	28.21	500yr

Powered by ACIS
Northeast Regional Climate Center

APPENDIX B: SOILS MAP AND TEST PIT LOGS

Hydrologic Soil Group—Middlesex County, Massachusetts
(Arlington Reservoir)

Map Scale: 1:2,280 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 20, Jun 9, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 11, 2019—Oct 5, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1	Water		7.3	47.2%
253B	Hinckley loamy sand, 3 to 8 percent slopes	A	7.2	46.4%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	A	0.8	5.4%
631C	Charlton-Urban land-Hollis complex, 3 to 15 percent slopes, rocky	A	0.2	1.1%
Totals for Area of Interest			**15.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Commonwealth of Massachusetts
City/Town of Arlington

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

A. Facility Information

Town of Arlington
Owner Name

210 Lowell Street
Street Address

Map/Lot #

Arlington
City

MA
State

02474
Zip Code

B. Site Information

1. (Check one) ☐ New Construction ☐ Upgrade ☐ Repair Test pits for drainage purposes

2. Soil Survey Available? ☒ Yes ☐ No If yes: Web Soil Survey (Source) 253B (Soil Map Unit)

   Hinckley Loamy Sand (Soil Name)

   Soil Limitations:

   Sandy and gravelly glaciofluvial deposits (Soil Parent material)

   Landform:

3. Surficial Geological Report Available? ☒ Yes ☐ No If yes: MassGIS Oliver (Year Published/Source) Map Unit:

   Sand and gravel / till and bedrock
   Description of Geologic Map Unit:

4. Flood Rate Insurance Map Within a regulatory floodway? ☐ Yes ☒ No

5. Within a velocity zone? ☐ Yes ☒ No

6. Within a Mapped Wetland Area? ☐ Yes ☒ No If yes, MassGIS Wetland Data Layer: Wetland Type

7. Current Water Resource Conditions (USGS): 08/06/20 (Month/Day/ Year) Range: ☐ Above Normal ☒ Normal ☐ Below Normal

8. Other references reviewed:

Commonwealth of Massachusetts
City/Town of Arlington

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: TP-1 (Hole #) 08/06/20 (Date) 7:30 AM (Time) 70*, sunny (Weather) ____ (Latitude) ____ (Longitude:)

1. Land Use Parking lot (e.g., woodland, agricultural field, vacant lot, etc.) None (Vegetation) Many large boulders (Surface Stones (e.g., cobbles, stones, boulders, etc.)) 0-2 (Slope (%))

   Description of Location: See attached sketch

2. Soil Parent Material: Till ____ (Landform) ____ (Position on Landscape (SU, SH, BS, FS, TS))

3. Distances from: Open Water Body >25 feet Drainage Way N/A feet Wetlands >25 feet

   Property Line >10 feet Drinking Water Well N/A feet Other ____ feet

4. Unsuitable Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☒ Yes ☐ No If yes: 68" Depth Weeping from Pit ____ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-27	Fill										
27-38	A	Sandy Loam	10YR3/2						Massive	Friable	
38-44	B	Sandy Loam	10YR3/4						Massive	Friable	
44-84	C	Sandy Loam	10YR5/2	44"	High and Low Chroma	>2	2	10	Massive	Friable	

Additional Notes:

Commonwealth of Massachusetts
City/Town of Arlington

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: TP-2 (Hole #) 08/06/20 (Date) 7:45 AM (Time) 70*, sunny (Weather) ______ (Latitude) ______ (Longitude:)

1. Land Use Parking lot (e.g., woodland, agricultural field, vacant lot, etc.) None (Vegetation) Many large boulders (Surface Stones (e.g., cobbles, stones, boulders, etc.)) 0-2 (Slope (%))

   Description of Location: See attached sketch

2. Soil Parent Material: Till ______ (Landform) ______ (Position on Landscape (SU, SH, BS, FS, TS))

3. Distances from: Open Water Body >25 feet Drainage Way N/A feet Wetlands >25 feet
   Property Line >10 feet Drinking Water Well N/A feet Other ______ feet

4. Unsuitable Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: ______ Depth Weeping from Pit ______ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-16	Fill										
16-30	A	Sandy Loam	10YR3/2						Massive	Friable	
30-43	B	Sandy Loam	10YR6/6	30"	High and Low Chroma	>2			Massive	Friable	
43-60	C	Sandy Loam	10YR5/3				2	10	Massive	Friable	

Additional Notes:

Commonwealth of Massachusetts
City/Town of Arlington

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: TP-3 (Hole #) 08/06/20 (Date) 8:00 AM (Time) 70*, sunny (Weather) ______ (Latitude) ______ (Longitude:)

1. Land Use Parking lot (e.g., woodland, agricultural field, vacant lot, etc.) None (Vegetation) Many large boulders (Surface Stones (e.g., cobbles, stones, boulders, etc.)) 0-2 (Slope (%))

   Description of Location: See attached sketch

2. Soil Parent Material: Till ______ (Landform) ______ (Position on Landscape (SU, SH, BS, FS, TS))

3. Distances from: Open Water Body >25 feet Drainage Way N/A feet Wetlands >25 feet

   Property Line >10 feet Drinking Water Well N/A feet Other ______ feet

4. Unsuitable Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: ______ Depth Weeping from Pit ______ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-9	Fill										
9-25	B	Sandy Loam	10YR6/6						Massive	Friable	
25-55	C	Sandy Loam	10YR5/3	32"	High and Low Chroma	>2	2	10	Massive	Friable	

Additional Notes:

Commonwealth of Massachusetts
City/Town of Arlington

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review *(minimum of two holes required at every proposed primary and reserve disposal area)*

Deep Observation Hole Number: TP-4 (Hole #) 08/06/20 (Date) 8:30 AM (Time) 70*, sunny (Weather) ______ (Latitude) ______ (Longitude:)

1. Land Use Parking lot (e.g., woodland, agricultural field, vacant lot, etc.) None (Vegetation) Many large boulders (Surface Stones (e.g., cobbles, stones, boulders, etc.)) 0-2 (Slope (%))

   Description of Location: See attached sketch

2. Soil Parent Material: Till ______ (Landform) ______ (Position on Landscape (SU, SH, BS, FS, TS))

3. Distances from: Open Water Body >25 feet Drainage Way N/A feet Wetlands >25 feet
   Property Line >10 feet Drinking Water Well N/A feet Other ______ feet

4. Unsuitable Materials Present: ☐ Yes ☒ No If Yes: ☐ Disturbed Soil ☐ Fill Material ☐ Weathered/Fractured Rock ☐ Bedrock

5. Groundwater Observed: ☐ Yes ☒ No If yes: ______ Depth Weeping from Pit ______ Depth Standing Water in Hole

Soil Log

Depth (in)	Soil Horizon /Layer	Soil Texture (USDA	Soil Matrix: Color-Moist (Munsell)	Redoximorphic Features			Coarse Fragments % by Volume		Soil Structure	Soil Consistence (Moist)	Other
				Depth	Color	Percent	Gravel	Cobbles & Stones			
0-12	Fill										
12-61	C	Sandy Loam	10YR5/3	24"	High and Low Chroma	>2	2	10	Massive	Friable	

Additional Notes:

Commonwealth of Massachusetts
City/Town of Arlington

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

F. Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.100 through 15.107.

[signature]	08/06/20
Signature of Soil Evaluator	Date
William Hall, P.E., S.E. 13592	06/31/21
Typed or Printed Name of Soil Evaluator / License #	Expiration Date of License
Leyna Tobey - Woodard & Curran	N/A
Name of Approving Authority Witness	Approving Authority

Note: In accordance with 310 CMR 15.018(2) this form must be submitted to the approving authority within 60 days of the date of field testing, and to the designer and the property owner with Percolation Test Form 12.

Field Diagrams: Use this area for field diagrams:

See attached sketch

ARLINGTON RESERVOIR - PHASE 2

ARLINGTON, MASSACHUSETTS

TOWN OF ARLINGTON

NO.	REVISION	DATE

kzla
Kyle Zick Landscape Architecture, Inc.
36 Bromfield Street Suite 202 617 451-1018 Tel
Boston, MA 02108 www.kylezick.com

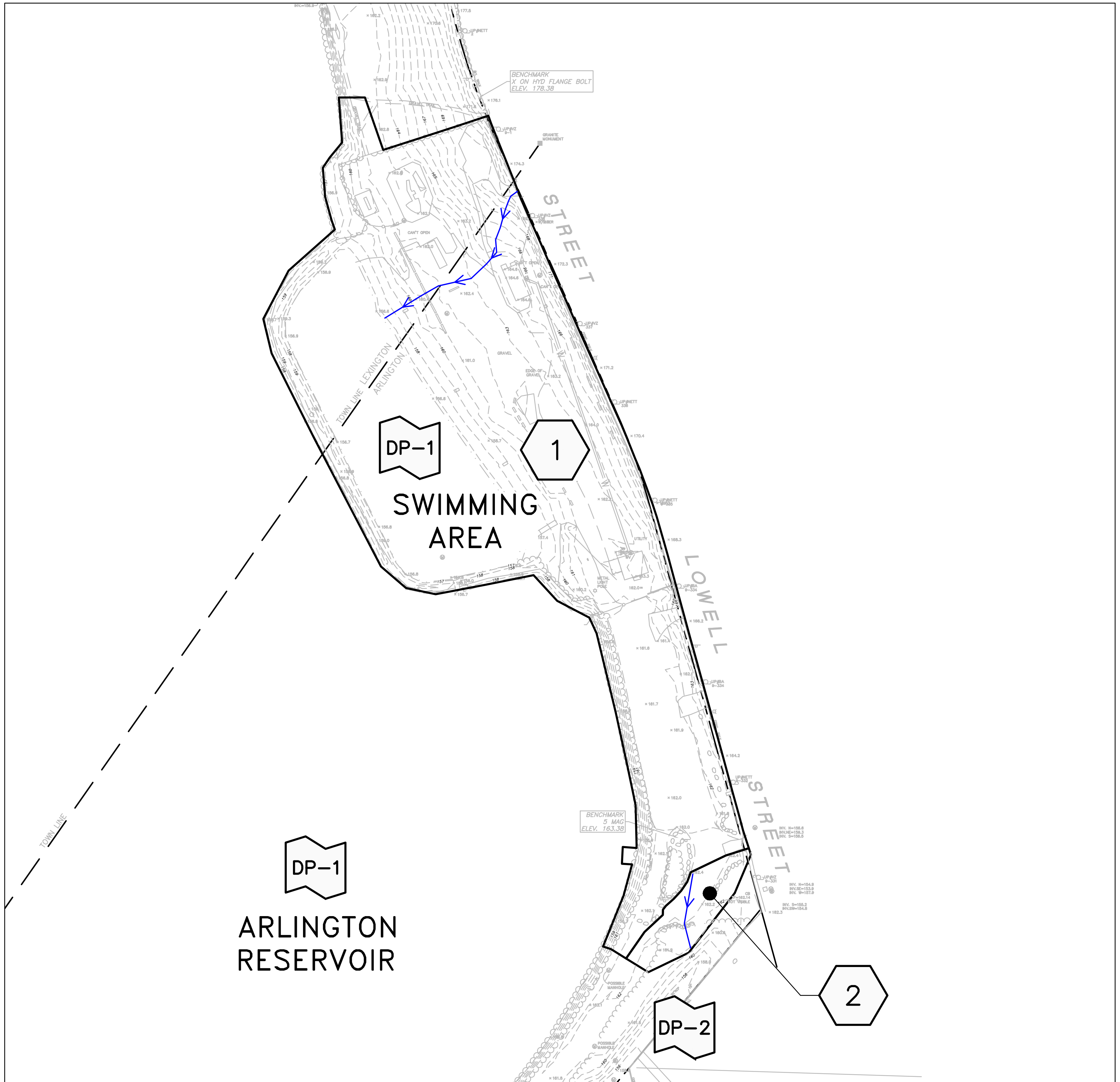
SCHEMATIC DESIGN SET

Job Number:
Project: ARLINGTON RES.
Drawn By: MD Checked By: KZ
Date: JUNE 30, 2020
Scale: 1"=50'-0"
Drawing Title:

ENLARGEMENT PLAN

LX

APPENDIX C: STORMWATER FIGURES



N

LEGEND:

SUBCATCHMENT AREA

DESIGN POINT

LONGEST FLOW PATH

150' 0 150' 300'

BAR SCALE
1" = 150'
CHECK GRAPHIC SCALE BEFORE USING

WOODARD
&CURRAN
40 Shattuck Road, Suite 110
Andover, Massachusetts 01810
866.702.6371 | www.woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

PRE–DEVELOPMENT
CATCHMENT FIGURE

DESIGNED BY: LLT
DRAWN BY: LLT
CHECKED BY: BSM
2020.10.05 0233115.00–P*.dwg

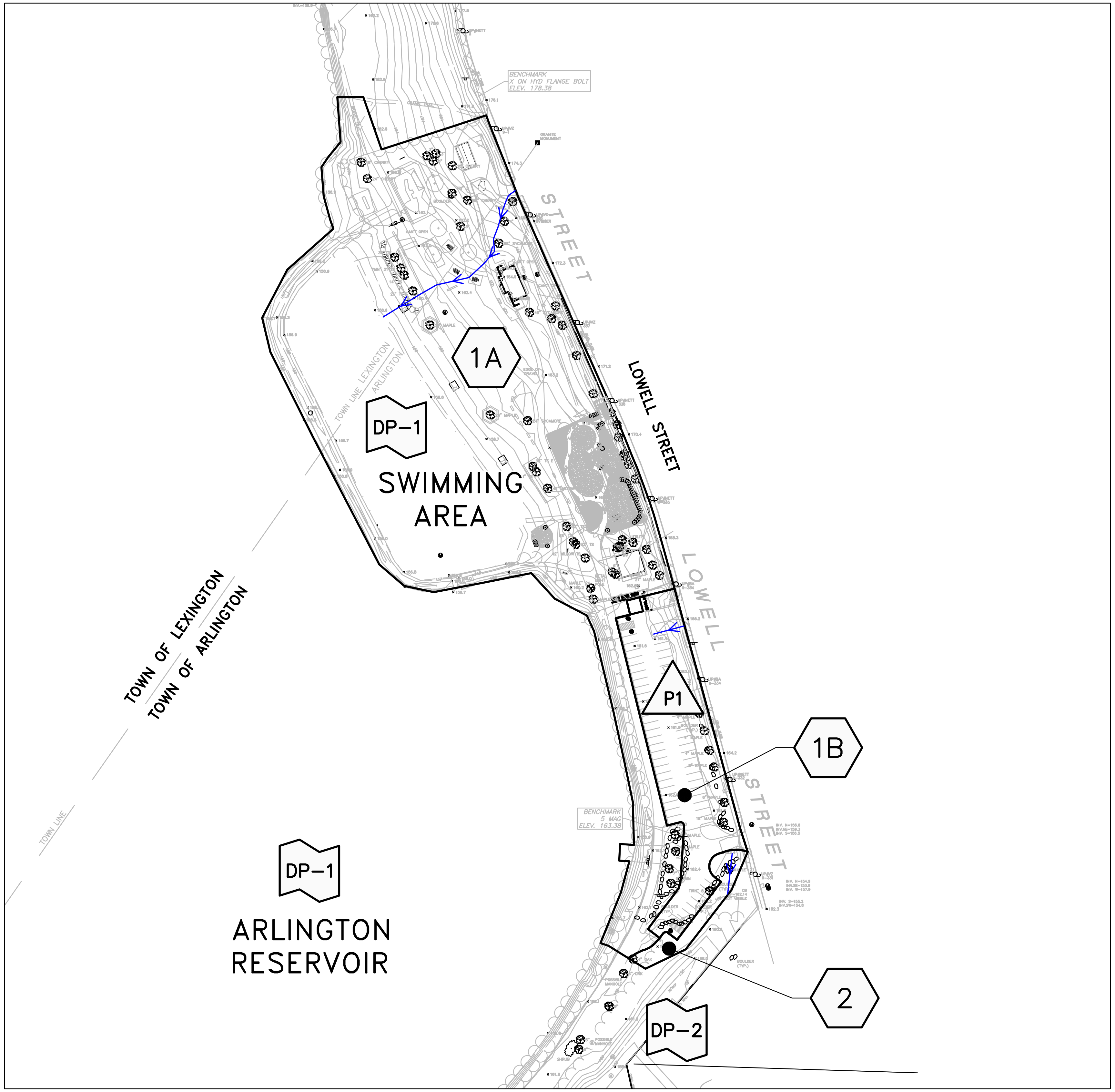
TOWN OF ARLINGTON, MASSACHUSETTS

ARLINGTON RESERVOIR – PHASE 2

JOB NO: 0233115.00
DATE: OCTOBER 2020
SCALE: AS NOTED

FIGURE 1

\\woodardcurran.net\shared\Projects\0233115.00 KZLA Architects – Arlington Reservoir Phase 2\wip\Drawings\Civil\2020.10.05 0233115.00–PRE WATERSHED.dwg, Oct 05, 2020 – 3:32pm LTOBEY



N

LEGEND:

- SUBCATCHMENT AREA
- DESIGN POINT
- POND
- LONGEST FLOW PATH

150' 0 150' 300'

BAR SCALE
1" = 150'
CHECK GRAPHIC SCALE BEFORE USING

WOODARD & CURRAN
40 Shattuck Road, Suite 110
Andover, Massachusetts 01810
866.702.6371 | www.woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

POST-DEVELOPMENT CATCHMENT FIGURE

DESIGNED BY: LLT
DRAWN BY: LLT
CHECKED BY: BSM
2020.09.29 0233115.00-P*.dwg

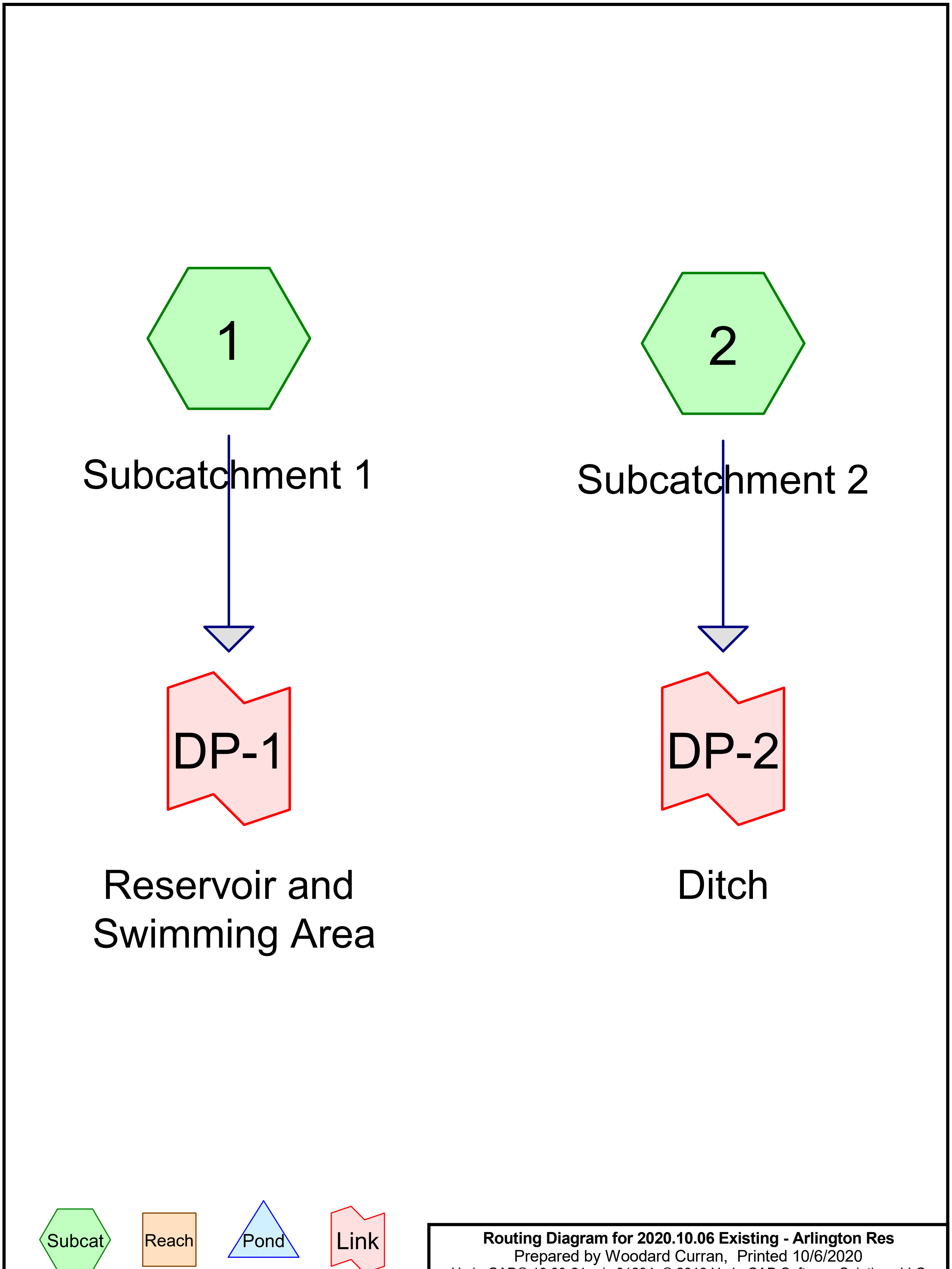
TOWN OF ARLINGTON, MASSACHUSETTS
ARLINGTON RESERVOIR – PHASE 2

JOB NO: 0233115.00
DATE: OCTOBER 2020
SCALE: AS NOTED

FIGURE 2

\\woodardcurran.net\shared\Projects\0233115.00 KZLA Architects – Arlington Reservoir Phase 2\wip\Drawings\Civil\2020.09.29 0233115.00-POST WATERSHED.dwg, Oct 06, 2020 – 1:51pm LTOBEY

APPENDIX D: HYDROCAD STORMWATER MODEL REPORTS



Routing Diagram for 2020.10.06 Existing - Arlington Res
Prepared by Woodard Curran, Printed 10/6/2020
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.531	49	50-75% Grass cover, Fair, HSG A (1, 2)
1.317	63	Beach Sand, HSG A (1)
0.379	30	Brush, Good, HSG A (1, 2)
0.046	96	Dense Sand Path, HSG A (1)
0.646	98	Gravel parking, HSG A (1, 2)
0.234	98	Impervious Surface, HSG A (1, 2)
0.055	39	Open Space, Good, HSG A (>75% Grass Cover) (1)
1.207	98	Water Surface, HSG A (1)
5.416	**70**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
5.416	HSG A	1, 2
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
5.416		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
1.531	0.000	0.000	0.000	0.000	1.531	50-75% Grass cover, Fair	1, 2
1.317	0.000	0.000	0.000	0.000	1.317	Beach Sand	1
0.379	0.000	0.000	0.000	0.000	0.379	Brush, Good	1, 2
0.046	0.000	0.000	0.000	0.000	0.046	Dense Sand Path	1
0.646	0.000	0.000	0.000	0.000	0.646	Gravel parking	1, 2
0.234	0.000	0.000	0.000	0.000	0.234	Impervious Surface	1, 2
0.055	0.000	0.000	0.000	0.000	0.055	Open Space, Good	1
1.207	0.000	0.000	0.000	0.000	1.207	Water Surface	1
5.416	**0.000**	**0.000**	**0.000**	**0.000**	**5.416**	**TOTAL AREA**	

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=227,252 sf 38.51% Impervious Runoff Depth=0.58"
Tc=6.0 min CN=71 Runoff=2.96 cfs 0.251 af

Subcatchment 2: Subcatchment 2 Runoff Area=8,681 sf 39.47% Impervious Runoff Depth=0.33"
Tc=6.0 min CN=64 Runoff=0.04 cfs 0.006 af

Link DP-1: Reservoir and Swimming Area Inflow=2.96 cfs 0.251 af
Primary=2.96 cfs 0.251 af

Link DP-2: Ditch Inflow=0.04 cfs 0.006 af
Primary=0.04 cfs 0.006 af

Total Runoff Area = 5.416 ac Runoff Volume = 0.257 af Average Runoff Depth = 0.57"
61.46% Pervious = 3.329 ac 38.54% Impervious = 2.088 ac

Summary for Subcatchment 1: Subcatchment 1

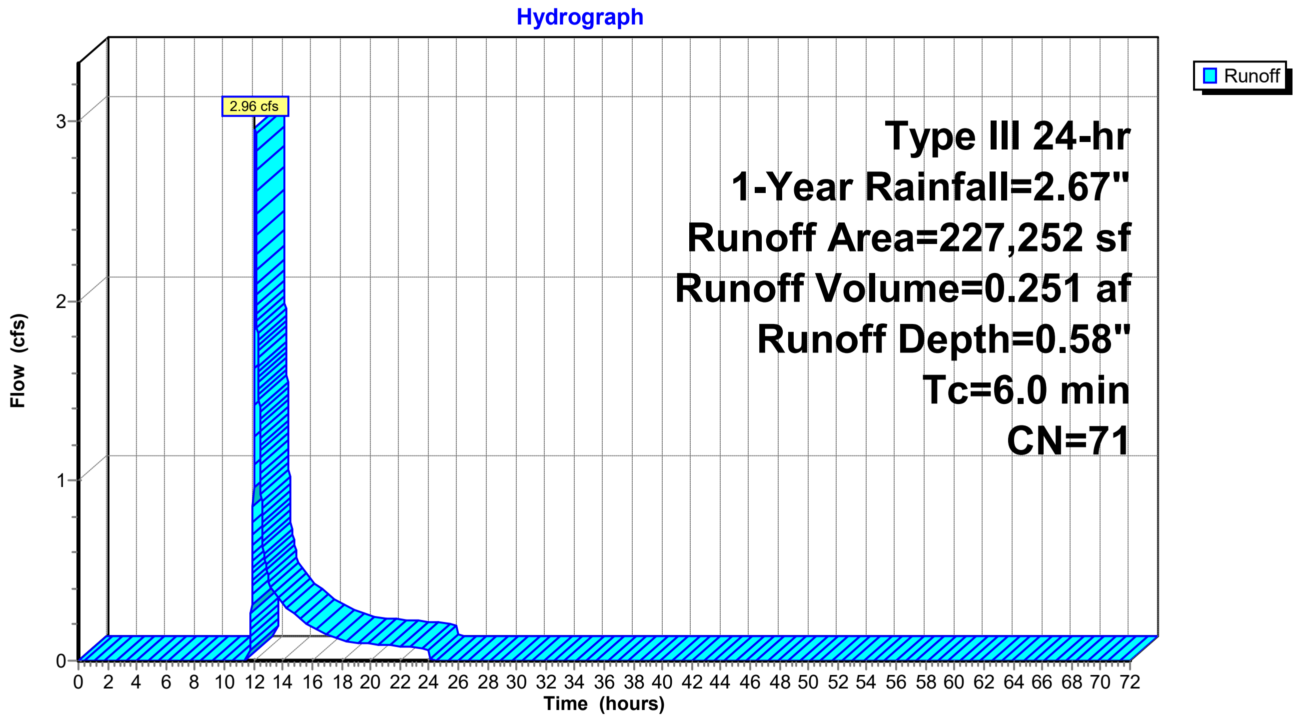
Runoff = 2.96 cfs @ 12.10 hrs, Volume= 0.251 af, Depth= 0.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.67"

	Area (sf)	CN	Description
	14,435	30	Brush, Good, HSG A
*	57,370	63	Beach Sand, HSG A
*	1,998	96	Dense Sand Path, HSG A
	63,530	49	50-75% Grass cover, Fair, HSG A
*	24,927	98	Gravel parking, HSG A
*	9,994	98	Impervious Surface, HSG A
	52,585	98	Water Surface, HSG A
*	2,413	39	Open Space, Good, HSG A (>75% Grass Cover)
	227,252	71	Weighted Average
	139,746		61.49% Pervious Area
	87,506		38.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1: Subcatchment 1



Summary for Subcatchment 2: Subcatchment 2

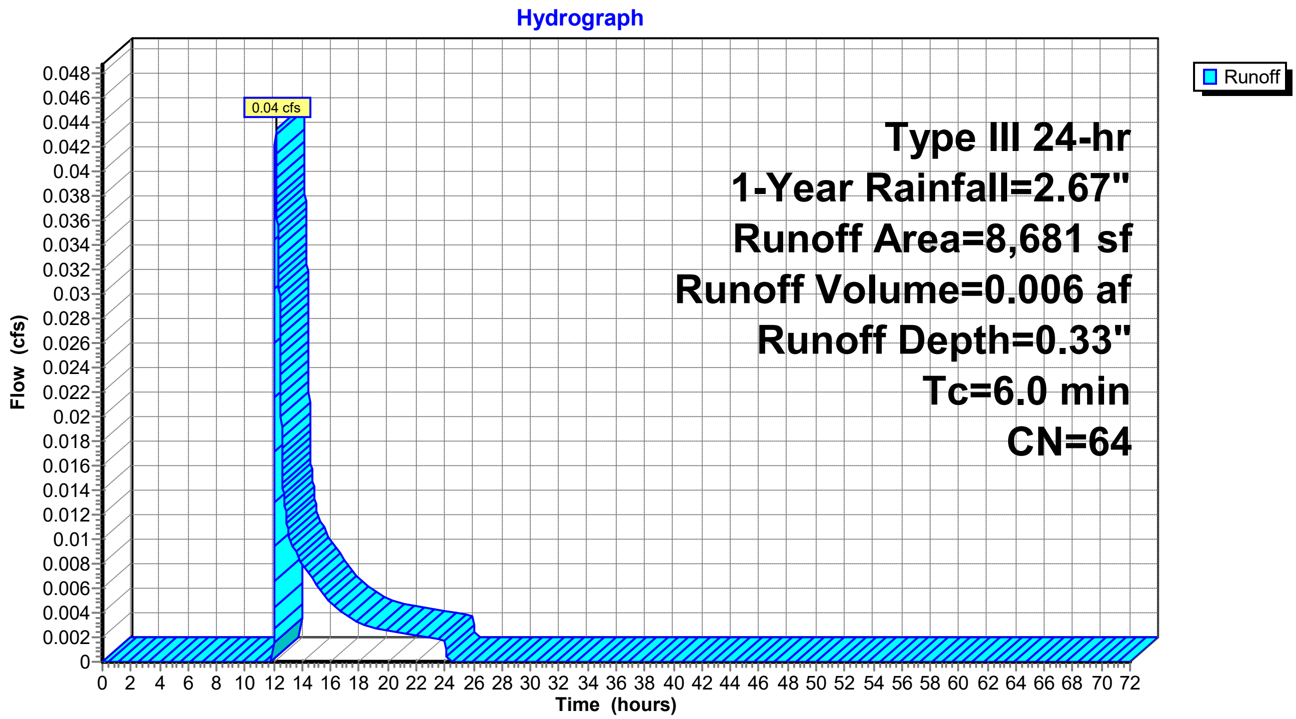
Runoff = 0.04 cfs @ 12.13 hrs, Volume= 0.006 af, Depth= 0.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.67"

	Area (sf)	CN	Description
	2,076	30	Brush, Good, HSG A
	3,179	49	50-75% Grass cover, Fair, HSG A
*	3,211	98	Gravel parking, HSG A
	215	98	Impervious Surface, HSG A
	8,681	64	Weighted Average
	5,255		60.53% Pervious Area
	3,426		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2

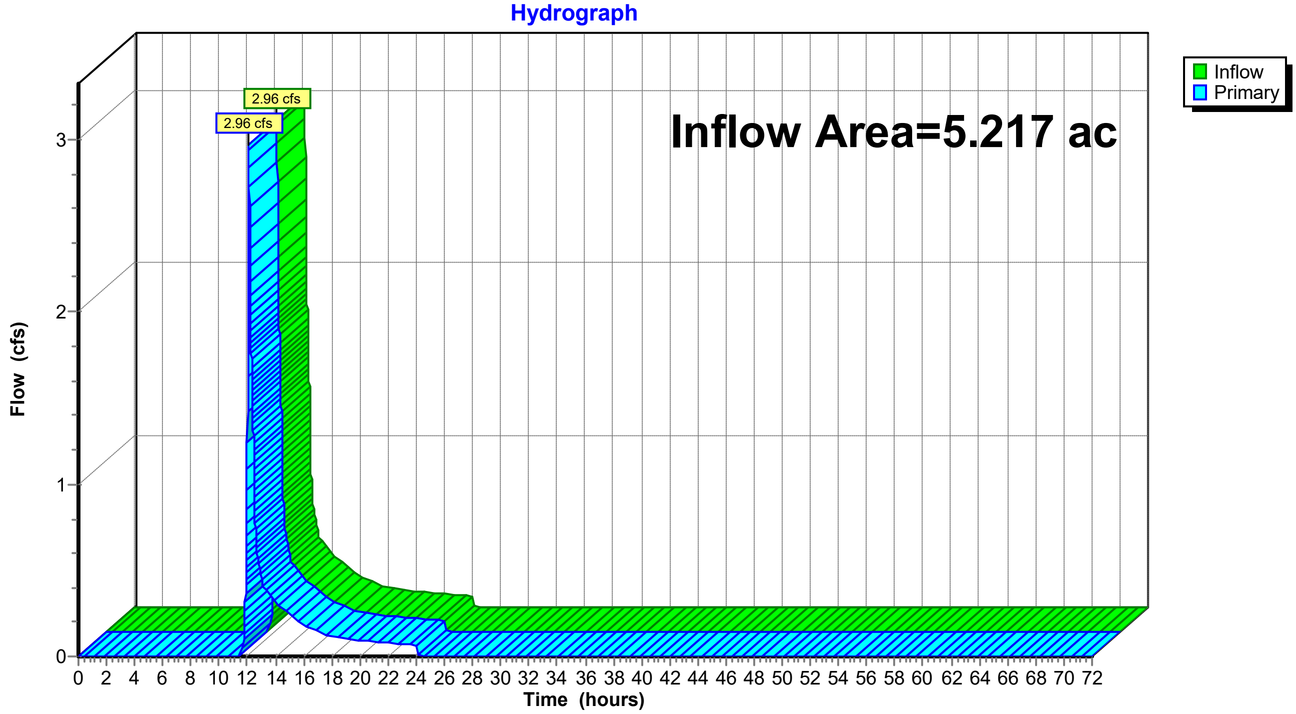


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.217 ac,	38.51% Impervious,	Inflow Depth = 0.58"	for 1-Year event
Inflow =	2.96 cfs @	12.10 hrs, Volume=	0.251 af	
Primary =	2.96 cfs @	12.10 hrs, Volume=	0.251 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

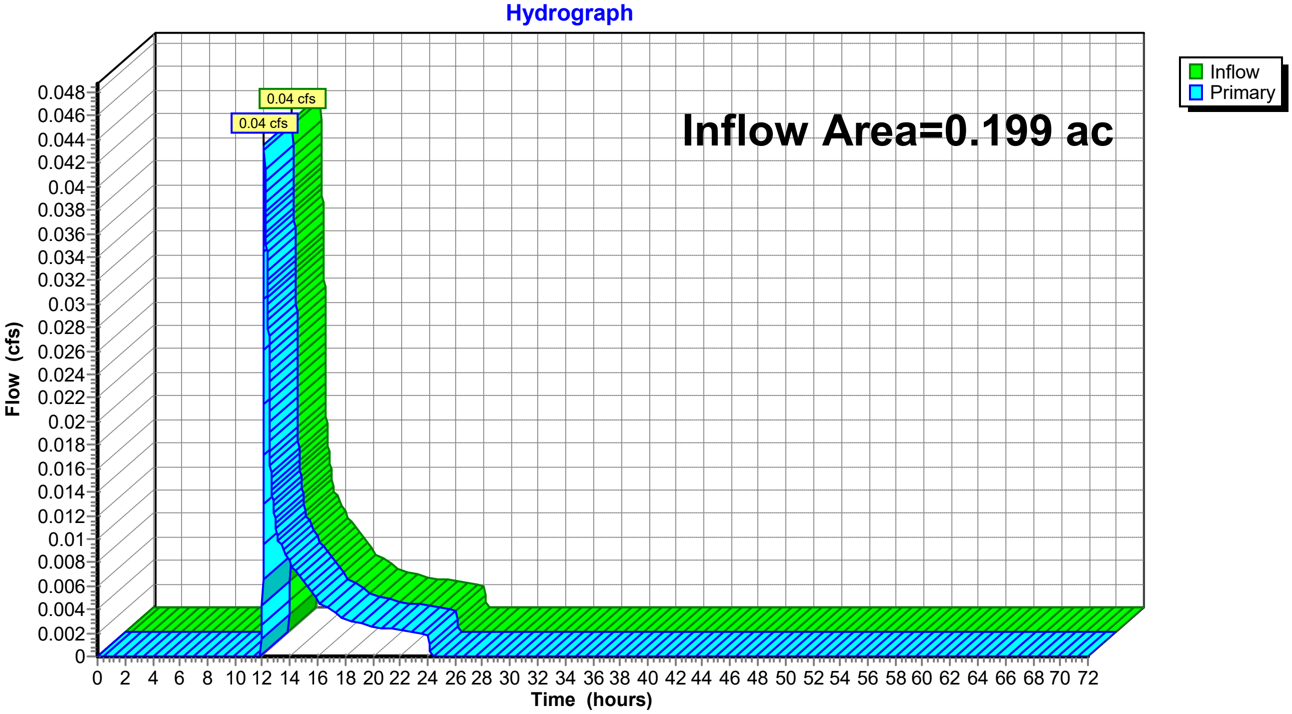


Summary for Link DP-2: Ditch

Inflow Area = 0.199 ac, 39.47% Impervious, Inflow Depth = 0.33" for 1-Year event
Inflow = 0.04 cfs @ 12.13 hrs, Volume= 0.006 af
Primary = 0.04 cfs @ 12.13 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=227,252 sf 38.51% Impervious Runoff Depth=0.88"
Tc=6.0 min CN=71 Runoff=4.93 cfs 0.384 af

Subcatchment 2: Subcatchment 2 Runoff Area=8,681 sf 39.47% Impervious Runoff Depth=0.56"
Tc=6.0 min CN=64 Runoff=0.10 cfs 0.009 af

Link DP-1: Reservoir and Swimming Area Inflow=4.93 cfs 0.384 af
Primary=4.93 cfs 0.384 af

Link DP-2: Ditch Inflow=0.10 cfs 0.009 af
Primary=0.10 cfs 0.009 af

Total Runoff Area = 5.416 ac Runoff Volume = 0.394 af Average Runoff Depth = 0.87"
61.46% Pervious = 3.329 ac 38.54% Impervious = 2.088 ac

Summary for Subcatchment 1: Subcatchment 1

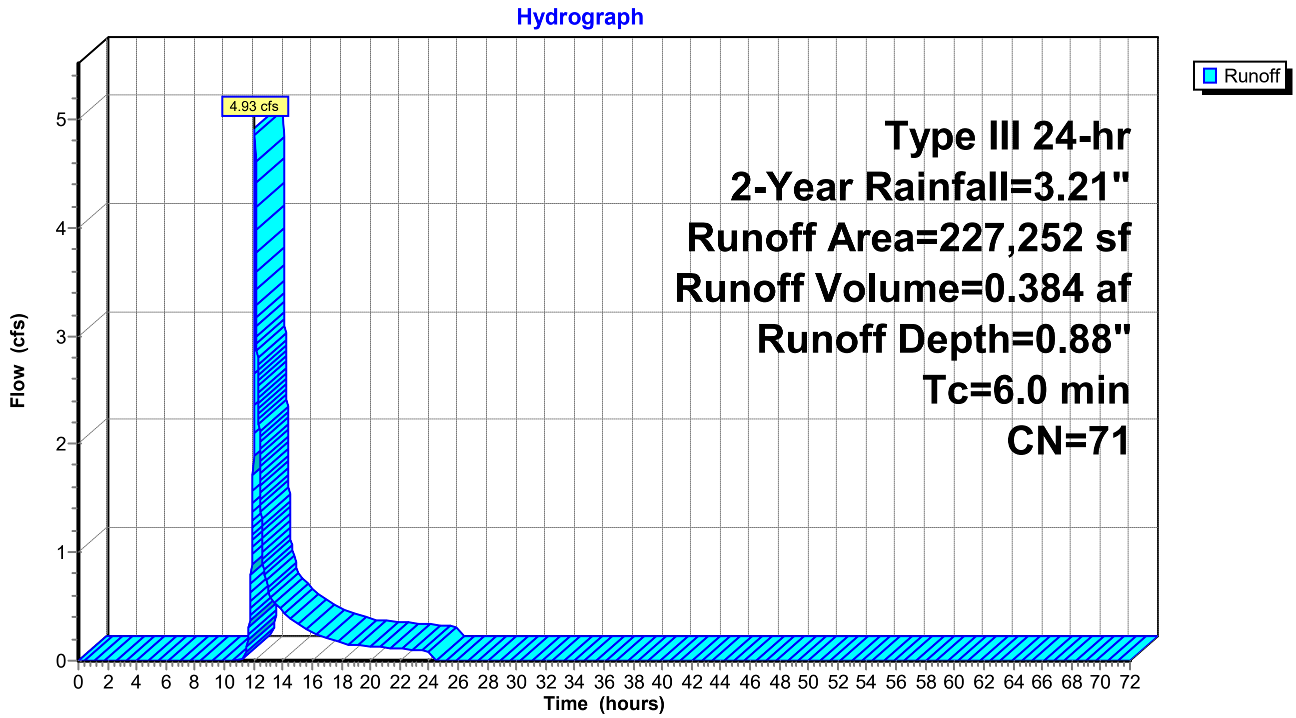
Runoff = 4.93 cfs @ 12.10 hrs, Volume= 0.384 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.21"

	Area (sf)	CN	Description
	14,435	30	Brush, Good, HSG A
*	57,370	63	Beach Sand, HSG A
*	1,998	96	Dense Sand Path, HSG A
	63,530	49	50-75% Grass cover, Fair, HSG A
*	24,927	98	Gravel parking, HSG A
*	9,994	98	Impervious Surface, HSG A
	52,585	98	Water Surface, HSG A
*	2,413	39	Open Space, Good, HSG A (>75% Grass Cover)
	227,252	71	Weighted Average
	139,746		61.49% Pervious Area
	87,506		38.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1: Subcatchment 1



Summary for Subcatchment 2: Subcatchment 2

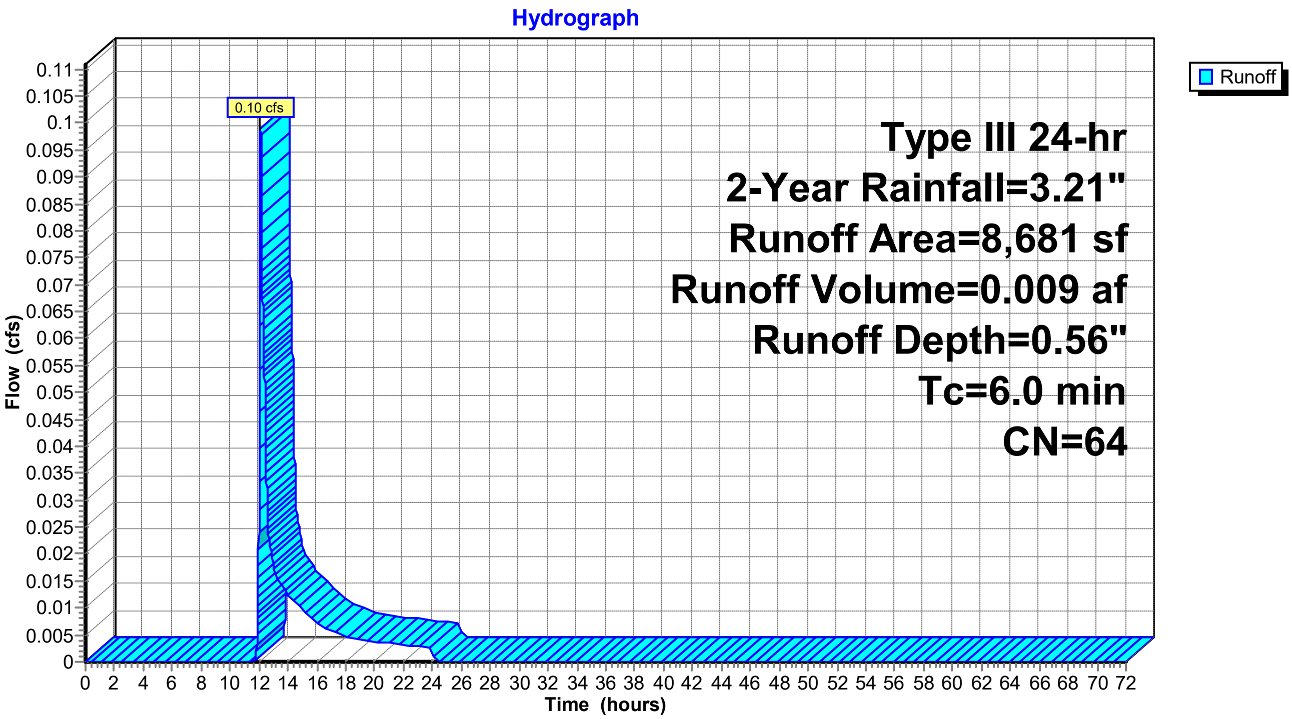
Runoff = 0.10 cfs @ 12.11 hrs, Volume= 0.009 af, Depth= 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.21"

	Area (sf)	CN	Description
	2,076	30	Brush, Good, HSG A
	3,179	49	50-75% Grass cover, Fair, HSG A
*	3,211	98	Gravel parking, HSG A
	215	98	Impervious Surface, HSG A
	8,681	64	Weighted Average
	5,255		60.53% Pervious Area
	3,426		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2

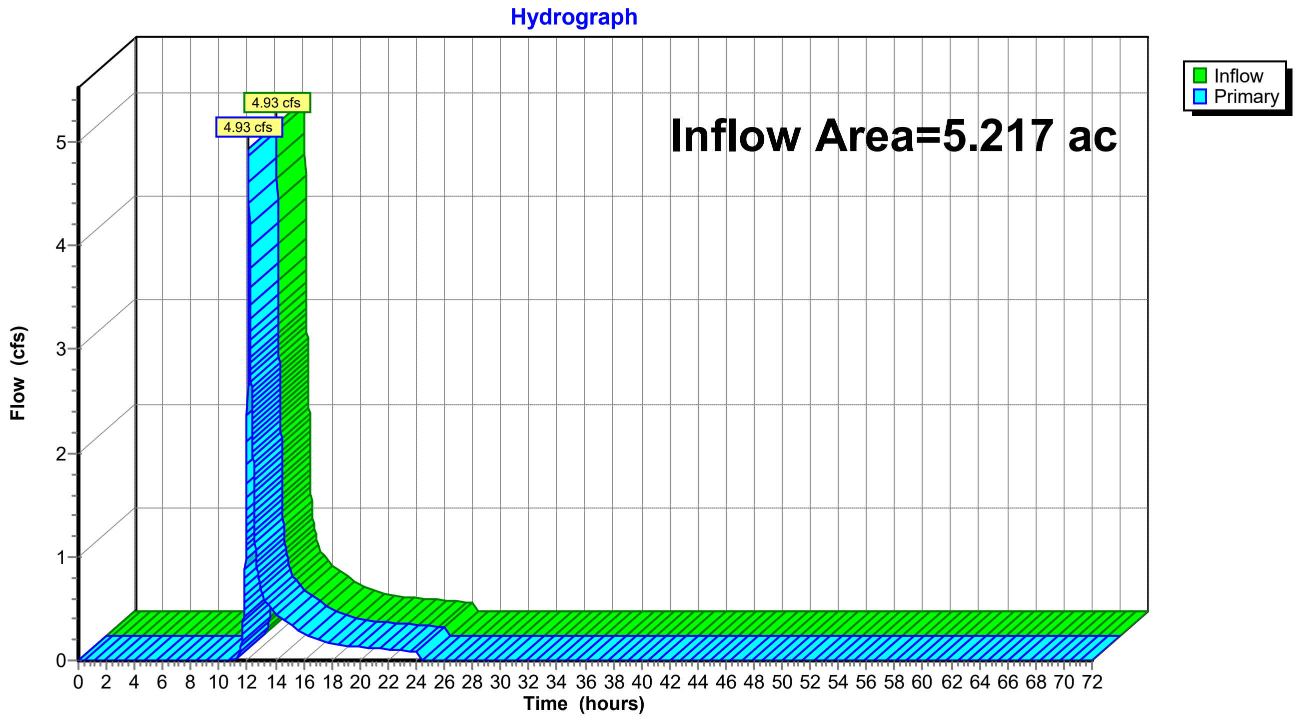


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.217 ac,	38.51% Impervious,	Inflow Depth = 0.88"	for 2-Year event	
Inflow =	4.93 cfs @	12.10 hrs,	Volume=	0.384 af	
Primary =	4.93 cfs @	12.10 hrs,	Volume=	0.384 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

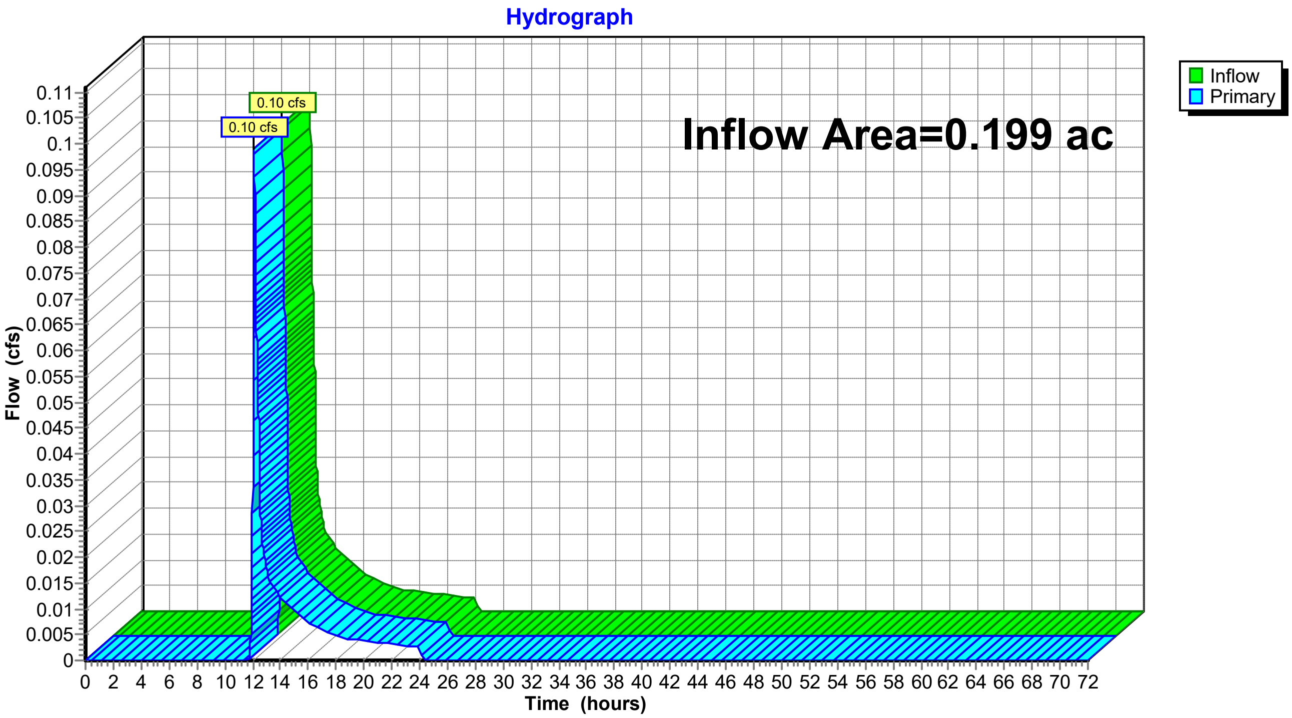


Summary for Link DP-2: Ditch

Inflow Area = 0.199 ac, 39.47% Impervious, Inflow Depth = 0.56" for 2-Year event
Inflow = 0.10 cfs @ 12.11 hrs, Volume= 0.009 af
Primary = 0.10 cfs @ 12.11 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=227,252 sf 38.51% Impervious Runoff Depth=2.01"
Tc=6.0 min CN=71 Runoff=12.11 cfs 0.874 af

Subcatchment 2: Subcatchment 2 Runoff Area=8,681 sf 39.47% Impervious Runoff Depth=1.49"
Tc=6.0 min CN=64 Runoff=0.33 cfs 0.025 af

Link DP-1: Reservoir and Swimming Area Inflow=12.11 cfs 0.874 af
Primary=12.11 cfs 0.874 af

Link DP-2: Ditch Inflow=0.33 cfs 0.025 af
Primary=0.33 cfs 0.025 af

Total Runoff Area = 5.416 ac Runoff Volume = 0.899 af Average Runoff Depth = 1.99"
61.46% Pervious = 3.329 ac 38.54% Impervious = 2.088 ac

Summary for Subcatchment 1: Subcatchment 1

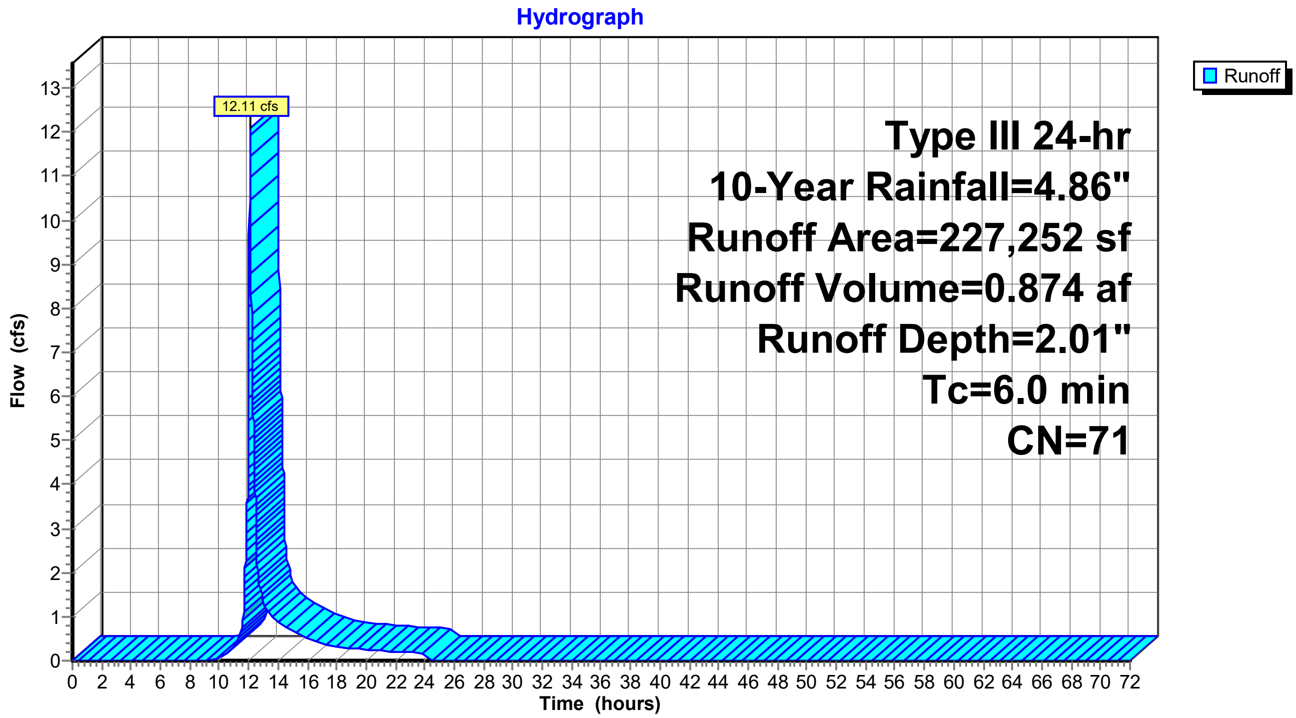
Runoff = 12.11 cfs @ 12.09 hrs, Volume= 0.874 af, Depth= 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
	14,435	30	Brush, Good, HSG A
*	57,370	63	Beach Sand, HSG A
*	1,998	96	Dense Sand Path, HSG A
	63,530	49	50-75% Grass cover, Fair, HSG A
*	24,927	98	Gravel parking, HSG A
*	9,994	98	Impervious Surface, HSG A
	52,585	98	Water Surface, HSG A
*	2,413	39	Open Space, Good, HSG A (>75% Grass Cover)
	227,252	71	Weighted Average
	139,746		61.49% Pervious Area
	87,506		38.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1: Subcatchment 1



Summary for Subcatchment 2: Subcatchment 2

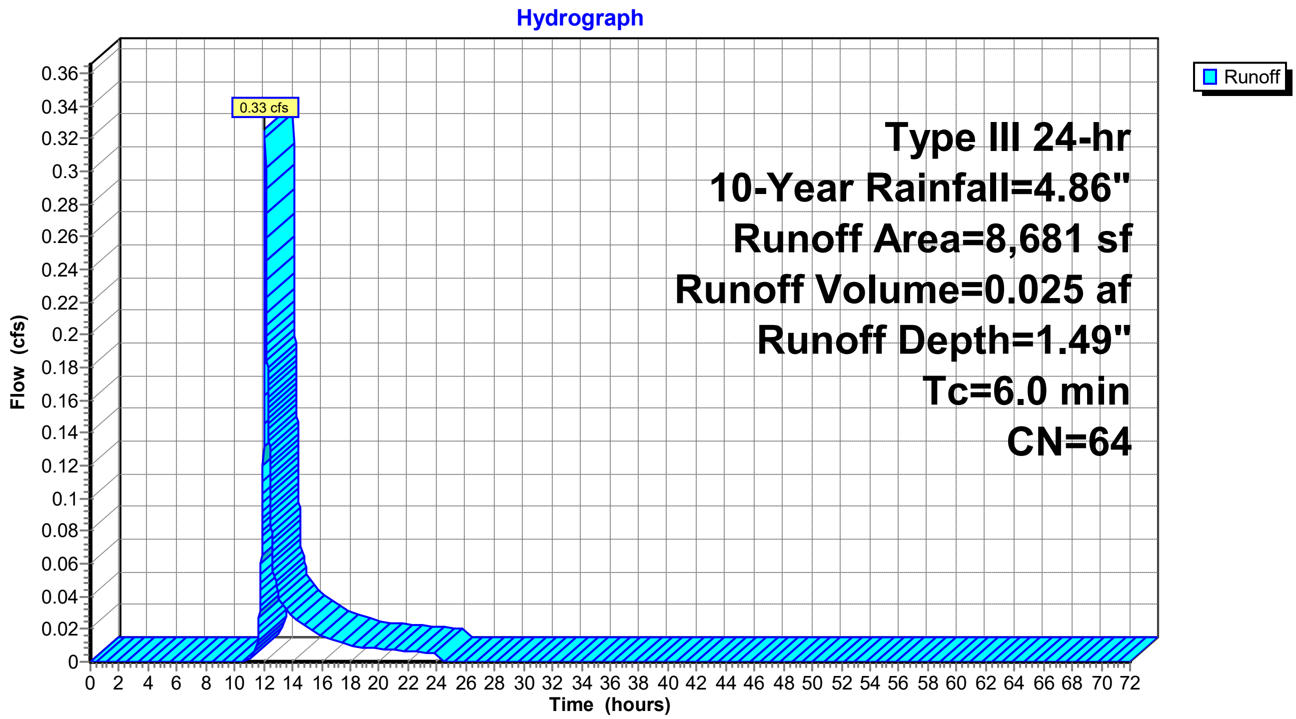
Runoff = 0.33 cfs @ 12.10 hrs, Volume= 0.025 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
	2,076	30	Brush, Good, HSG A
	3,179	49	50-75% Grass cover, Fair, HSG A
*	3,211	98	Gravel parking, HSG A
	215	98	Impervious Surface, HSG A
	8,681	64	Weighted Average
	5,255		60.53% Pervious Area
	3,426		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2

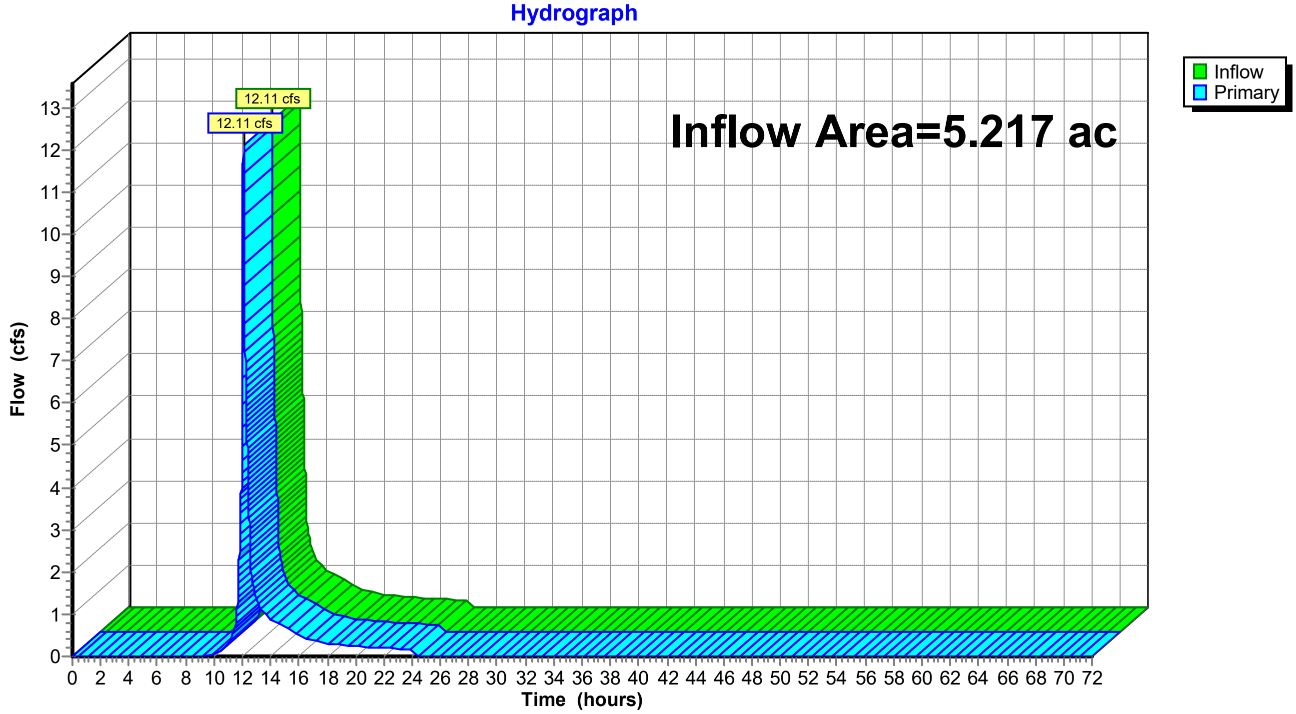


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area = 5.217 ac, 38.51% Impervious, Inflow Depth = 2.01" for 10-Year event
Inflow = 12.11 cfs @ 12.09 hrs, Volume= 0.874 af
Primary = 12.11 cfs @ 12.09 hrs, Volume= 0.874 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

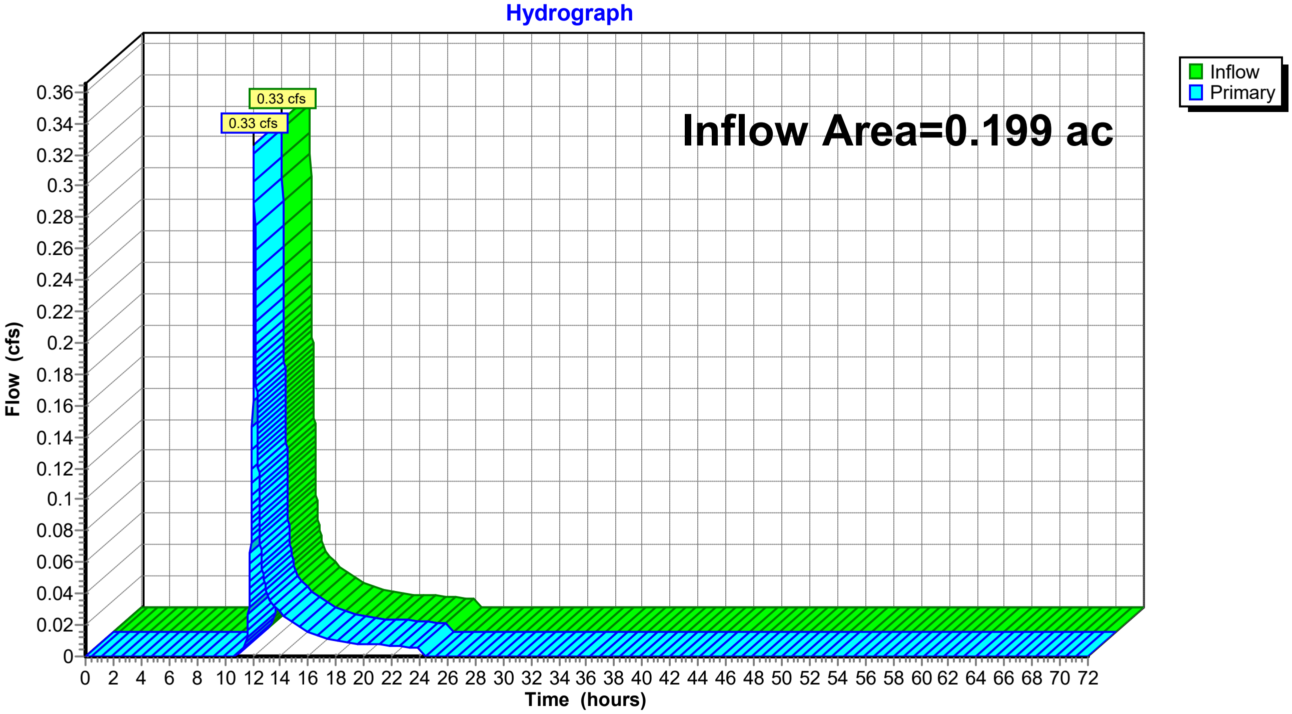


Summary for Link DP-2: Ditch

Inflow Area = 0.199 ac, 39.47% Impervious, Inflow Depth = 1.49" for 10-Year event
Inflow = 0.33 cfs @ 12.10 hrs, Volume= 0.025 af
Primary = 0.33 cfs @ 12.10 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=227,252 sf 38.51% Impervious Runoff Depth=3.04"
Tc=6.0 min CN=71 Runoff=18.53 cfs 1.320 af

Subcatchment 2: Subcatchment 2 Runoff Area=8,681 sf 39.47% Impervious Runoff Depth=2.39"
Tc=6.0 min CN=64 Runoff=0.54 cfs 0.040 af

Link DP-1: Reservoir and Swimming Area Inflow=18.53 cfs 1.320 af
Primary=18.53 cfs 1.320 af

Link DP-2: Ditch Inflow=0.54 cfs 0.040 af
Primary=0.54 cfs 0.040 af

Total Runoff Area = 5.416 ac Runoff Volume = 1.360 af Average Runoff Depth = 3.01"
61.46% Pervious = 3.329 ac 38.54% Impervious = 2.088 ac

Summary for Subcatchment 1: Subcatchment 1

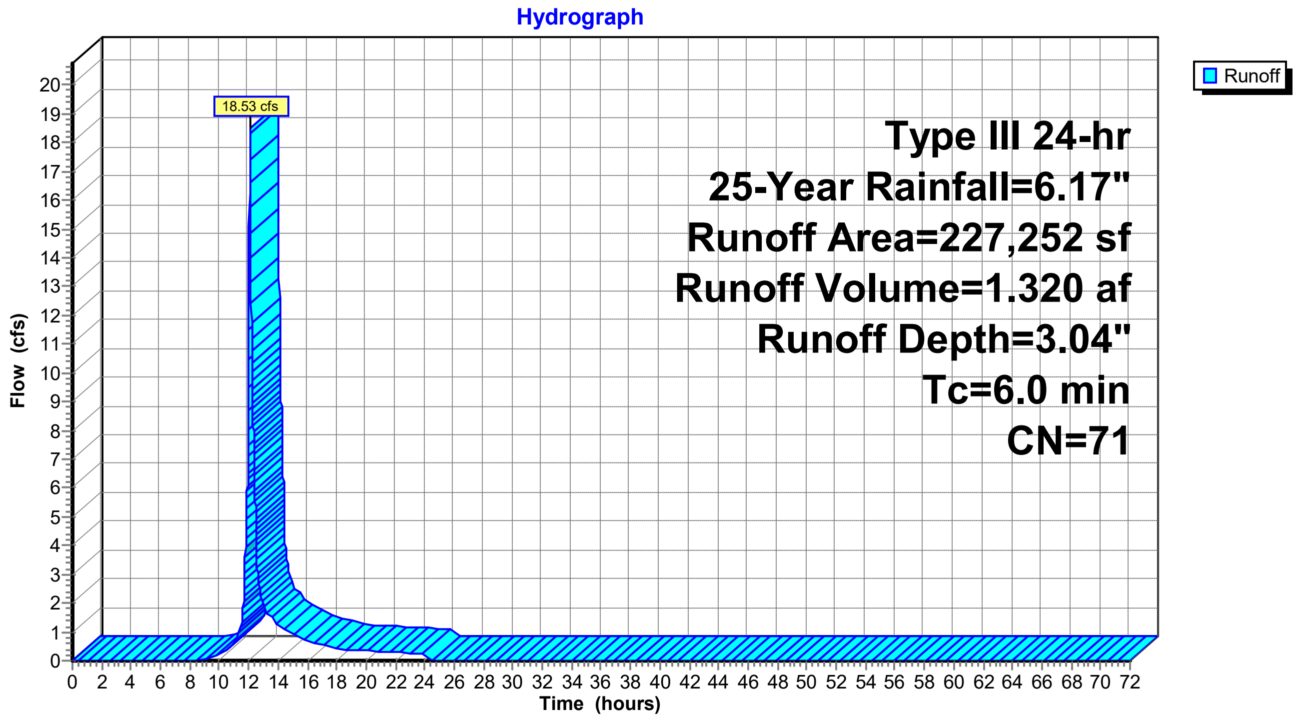
Runoff = 18.53 cfs @ 12.09 hrs, Volume= 1.320 af, Depth= 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.17"

	Area (sf)	CN	Description
	14,435	30	Brush, Good, HSG A
*	57,370	63	Beach Sand, HSG A
*	1,998	96	Dense Sand Path, HSG A
	63,530	49	50-75% Grass cover, Fair, HSG A
*	24,927	98	Gravel parking, HSG A
*	9,994	98	Impervious Surface, HSG A
	52,585	98	Water Surface, HSG A
*	2,413	39	Open Space, Good, HSG A (>75% Grass Cover)
	227,252	71	Weighted Average
	139,746		61.49% Pervious Area
	87,506		38.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1: Subcatchment 1



Summary for Subcatchment 2: Subcatchment 2

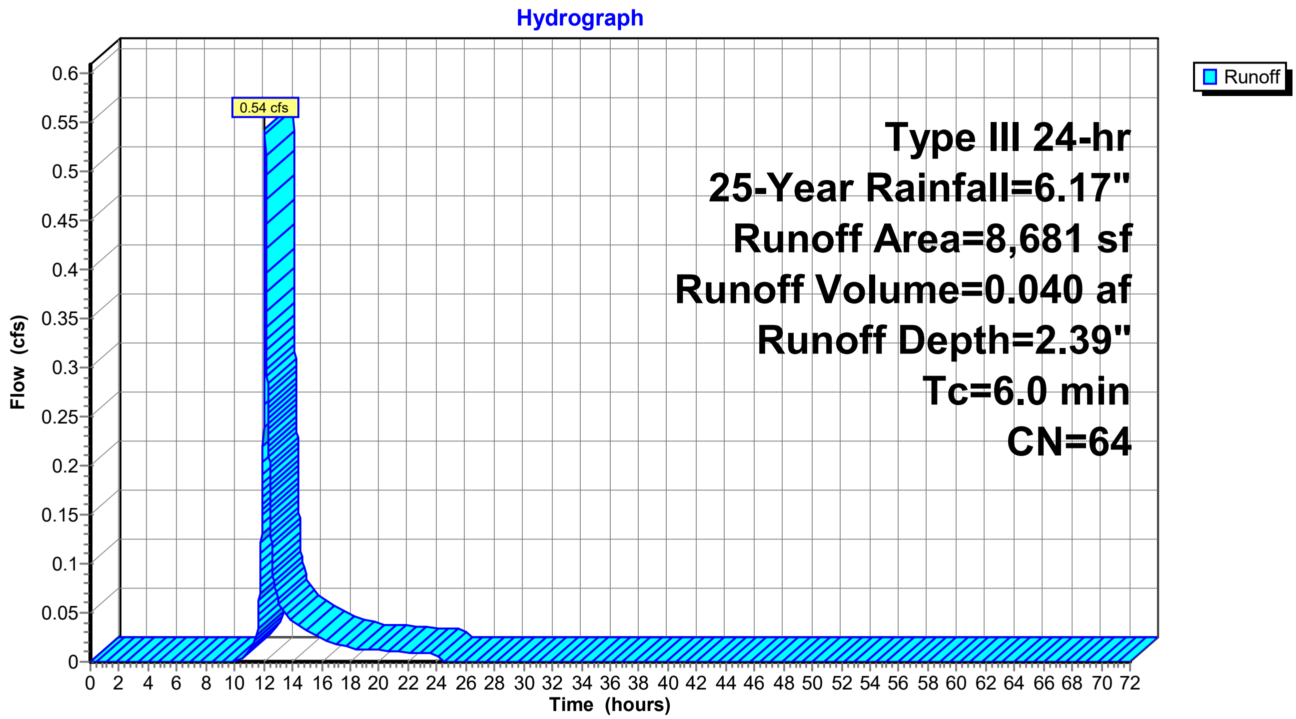
Runoff = 0.54 cfs @ 12.09 hrs, Volume= 0.040 af, Depth= 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.17"

	Area (sf)	CN	Description
	2,076	30	Brush, Good, HSG A
	3,179	49	50-75% Grass cover, Fair, HSG A
*	3,211	98	Gravel parking, HSG A
	215	98	Impervious Surface, HSG A
	8,681	64	Weighted Average
	5,255		60.53% Pervious Area
	3,426		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2

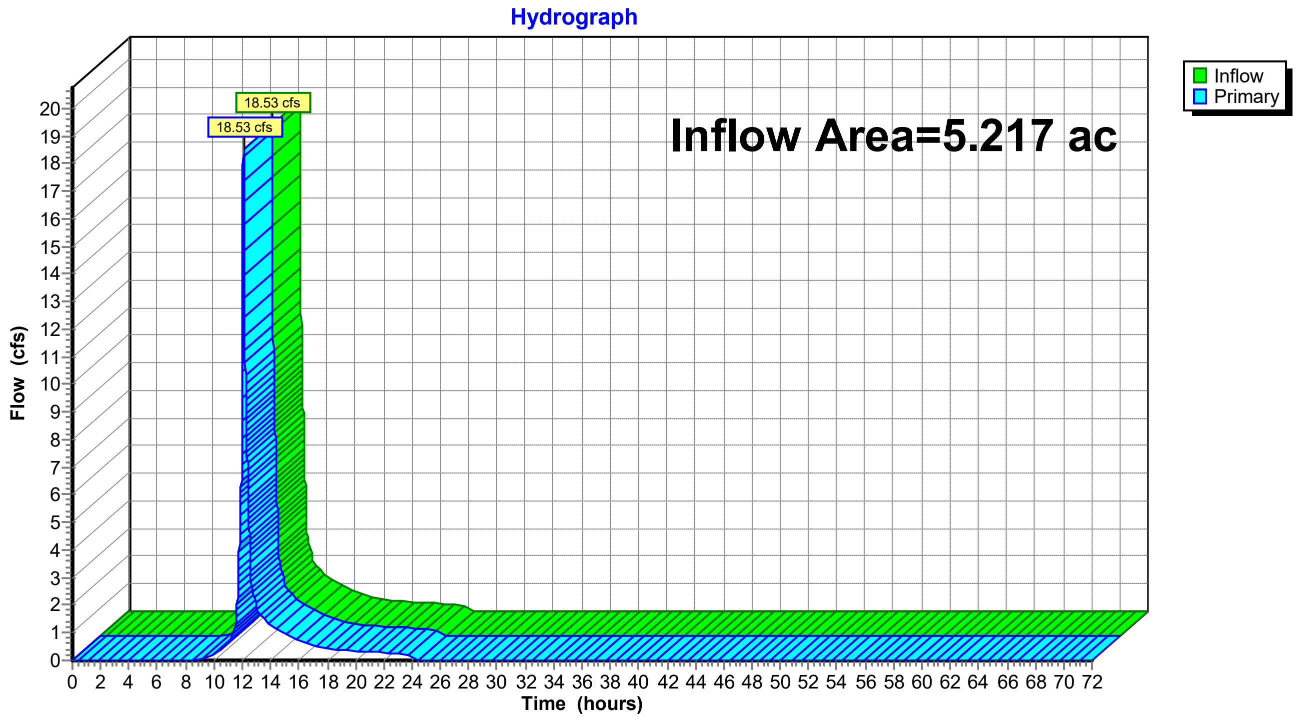


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.217 ac,	38.51% Impervious,	Inflow Depth = 3.04"	for 25-Year event
Inflow =	18.53 cfs @	12.09 hrs,	Volume=	1.320 af
Primary =	18.53 cfs @	12.09 hrs,	Volume=	1.320 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

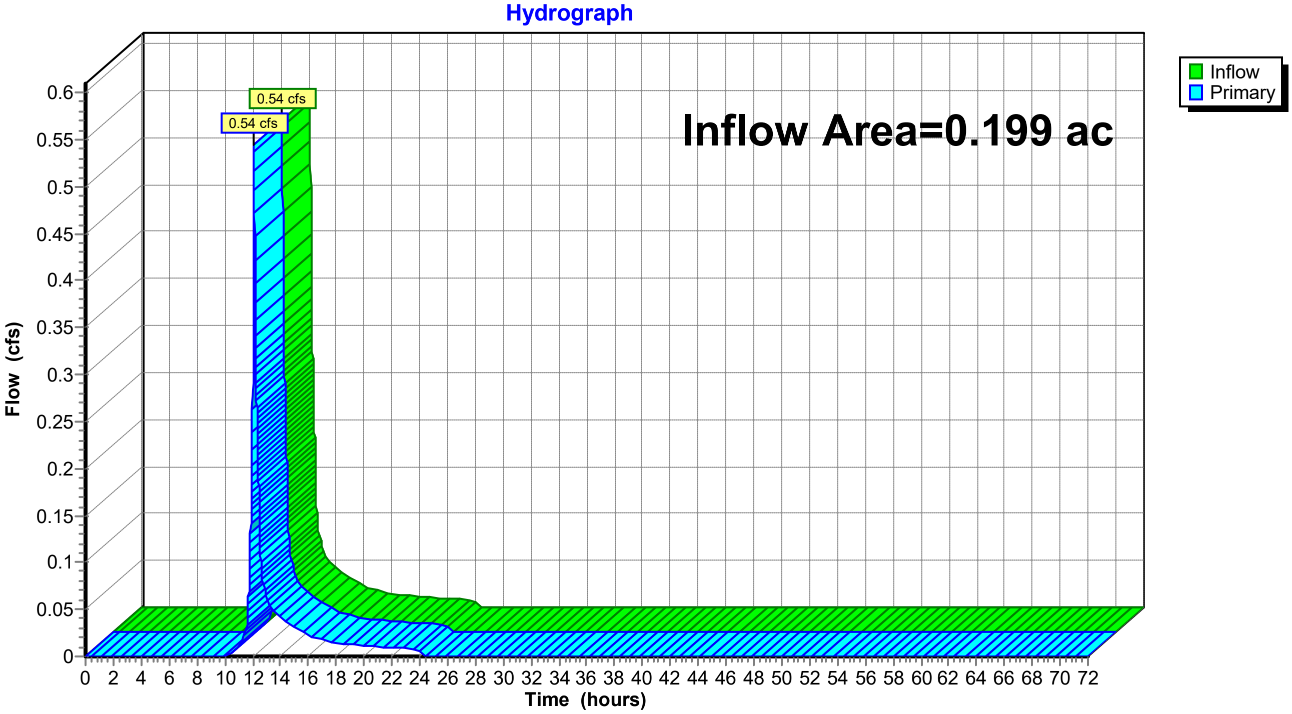


Summary for Link DP-2: Ditch

Inflow Area =	0.199 ac,	39.47% Impervious,	Inflow Depth = 2.39"	for 25-Year event
Inflow =	0.54 cfs @	12.09 hrs, Volume=	0.040 af	
Primary =	0.54 cfs @	12.09 hrs, Volume=	0.040 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Subcatchment 1 Runoff Area=227,252 sf 38.51% Impervious Runoff Depth=5.33"
Tc=6.0 min CN=71 Runoff=32.53 cfs 2.315 af

Subcatchment 2: Subcatchment 2 Runoff Area=8,681 sf 39.47% Impervious Runoff Depth=4.47"
Tc=6.0 min CN=64 Runoff=1.04 cfs 0.074 af

Link DP-1: Reservoir and Swimming Area Inflow=32.53 cfs 2.315 af
Primary=32.53 cfs 2.315 af

Link DP-2: Ditch Inflow=1.04 cfs 0.074 af
Primary=1.04 cfs 0.074 af

Total Runoff Area = 5.416 ac Runoff Volume = 2.389 af Average Runoff Depth = 5.29"
61.46% Pervious = 3.329 ac 38.54% Impervious = 2.088 ac

Summary for Subcatchment 1: Subcatchment 1

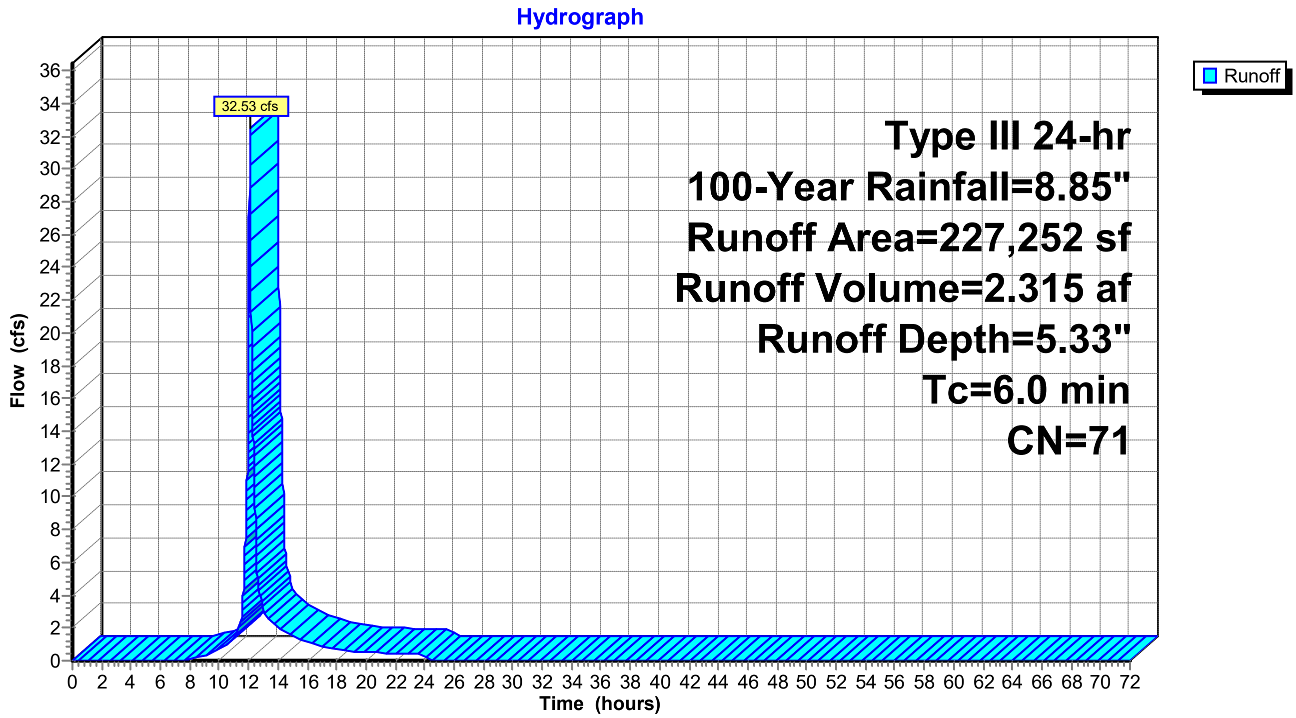
Runoff = 32.53 cfs @ 12.09 hrs, Volume= 2.315 af, Depth= 5.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.85"

	Area (sf)	CN	Description
	14,435	30	Brush, Good, HSG A
*	57,370	63	Beach Sand, HSG A
*	1,998	96	Dense Sand Path, HSG A
	63,530	49	50-75% Grass cover, Fair, HSG A
*	24,927	98	Gravel parking, HSG A
*	9,994	98	Impervious Surface, HSG A
	52,585	98	Water Surface, HSG A
*	2,413	39	Open Space, Good, HSG A (>75% Grass Cover)
	227,252	71	Weighted Average
	139,746		61.49% Pervious Area
	87,506		38.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1: Subcatchment 1



Summary for Subcatchment 2: Subcatchment 2

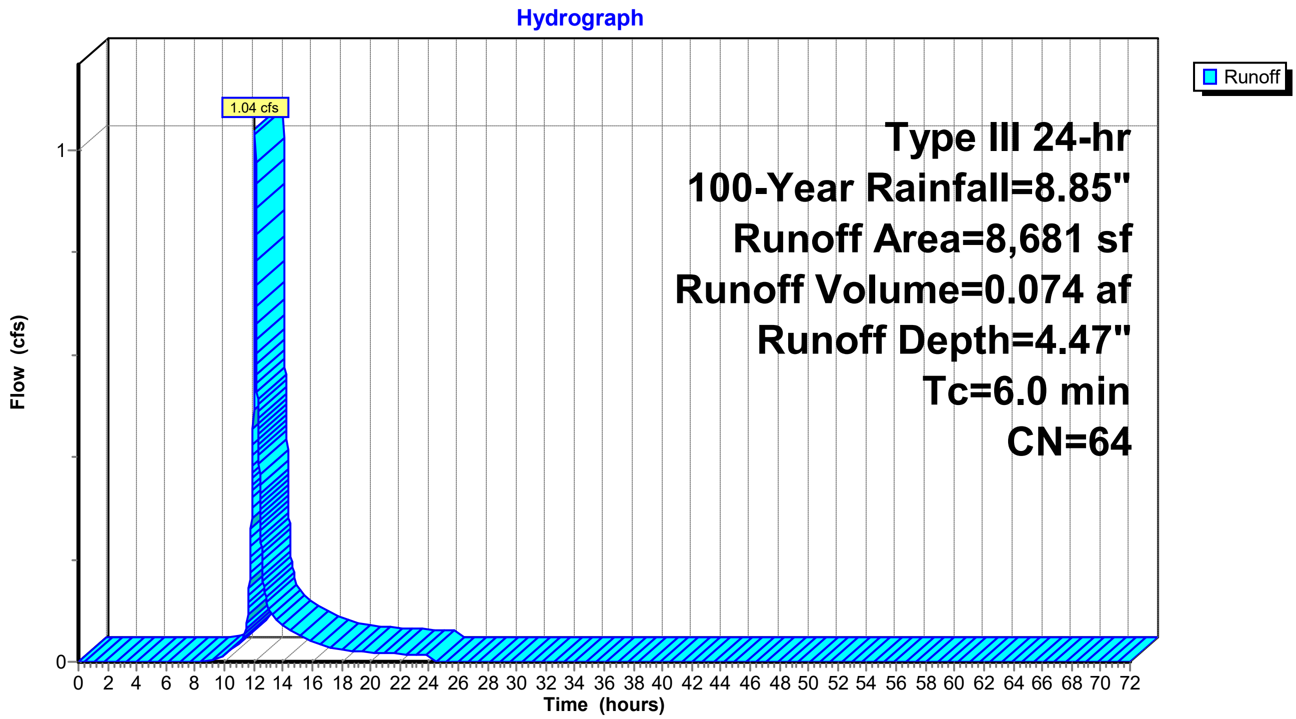
Runoff = 1.04 cfs @ 12.09 hrs, Volume= 0.074 af, Depth= 4.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.85"

	Area (sf)	CN	Description
	2,076	30	Brush, Good, HSG A
	3,179	49	50-75% Grass cover, Fair, HSG A
*	3,211	98	Gravel parking, HSG A
	215	98	Impervious Surface, HSG A
	8,681	64	Weighted Average
	5,255		60.53% Pervious Area
	3,426		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2

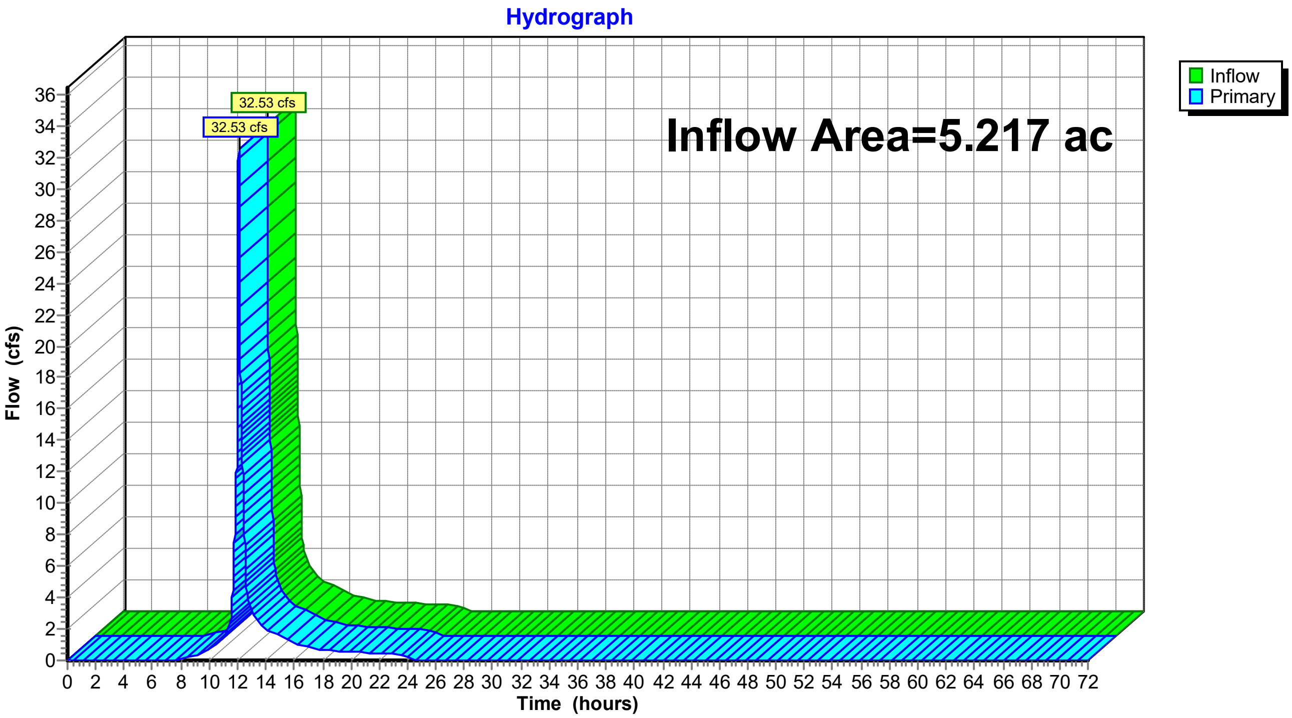


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.217 ac, 38.51% Impervious, Inflow Depth = 5.33"	for 100-Year event	
Inflow =	32.53 cfs @ 12.09 hrs, Volume=	2.315 af	
Primary =	32.53 cfs @ 12.09 hrs, Volume=	2.315 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

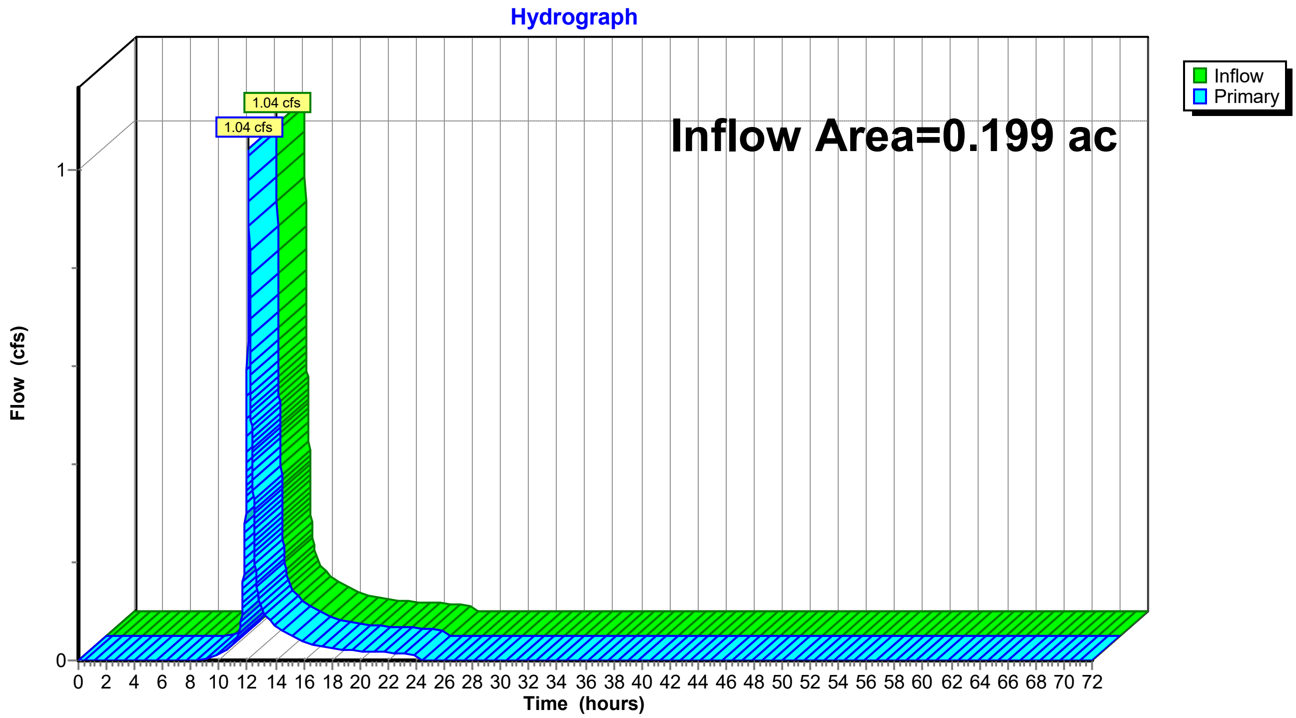


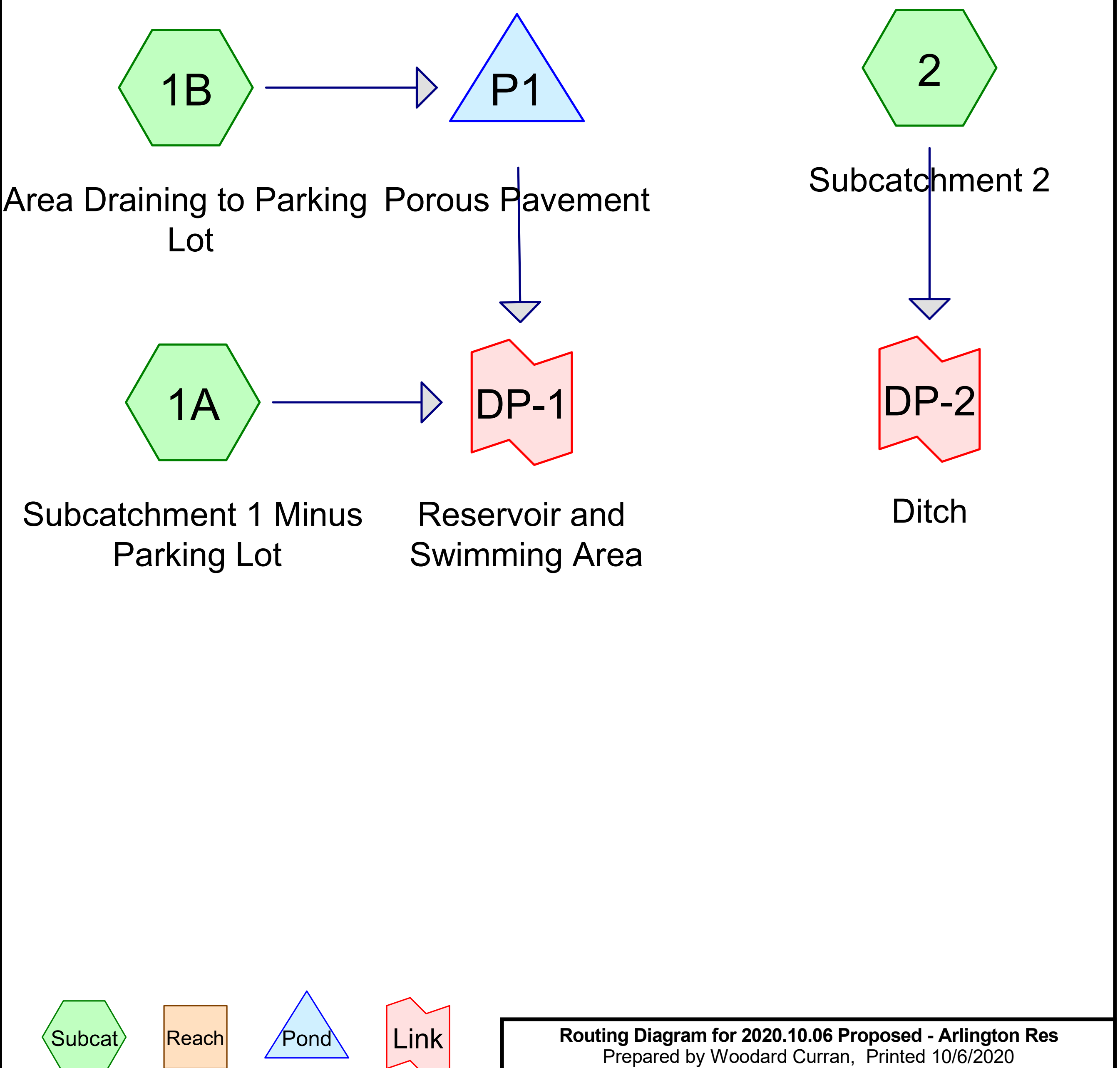
Summary for Link DP-2: Ditch

Inflow Area = 0.199 ac, 39.47% Impervious, Inflow Depth = 4.47" for 100-Year event
Inflow = 1.04 cfs @ 12.09 hrs, Volume= 0.074 af
Primary = 1.04 cfs @ 12.09 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch





Routing Diagram for 2020.10.06 Proposed - Arlington Res
Prepared by Woodard Curran, Printed 10/6/2020

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.573	39	>75% Grass cover, Good, HSG A (1A, 1B, 2)
1.029	63	Beach Sand, HSG A (1A)
0.304	30	Brush, Good, HSG A (1A)
0.467	98	Impervious Surface, HSG A (1A, 1B)
0.184	39	Permeable Playground Surface, Good, HSG A (1A)
0.521	98	Porous Pavement, HSG A (1A, 1B)
0.138	96	Stone Dust, HSG A (1A)
1.200	98	Water Surface, HSG A (1A)
5.416	**68**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
5.416	HSG A	1A, 1B, 2
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
5.416		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatch Numbers
1.573	0.000	0.000	0.000	0.000	1.573	>75% Grass cover, Good	
1.029	0.000	0.000	0.000	0.000	1.029	Beach Sand	
0.304	0.000	0.000	0.000	0.000	0.304	Brush, Good	
0.467	0.000	0.000	0.000	0.000	0.467	Impervious Surface	
0.184	0.000	0.000	0.000	0.000	0.184	Permeable Playground Surface, Good	
0.521	0.000	0.000	0.000	0.000	0.521	Porous Pavement	
0.138	0.000	0.000	0.000	0.000	0.138	Stone Dust	
1.200	0.000	0.000	0.000	0.000	1.200	Water Surface	
5.416	**0.000**	**0.000**	**0.000**	**0.000**	**5.416**	**TOTAL AREA**	

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	P1	162.15	162.05	20.0	0.0050	0.013	12.0	0.0	0.0

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A: Subcatchment 1 Runoff Area=201,945 sf 36.57% Impervious Runoff Depth=0.43"
Tc=6.0 min CN=67 Runoff=1.65 cfs 0.166 af

Subcatchment 1B: Area Draining to Runoff Area=29,873 sf 71.84% Impervious Runoff Depth=1.07"
Tc=6.0 min CN=81 Runoff=0.84 cfs 0.061 af

Subcatchment 2: Subcatchment 2 Runoff Area=4,115 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=39 Runoff=0.00 cfs 0.000 af

Pond P1: Porous Pavement Peak Elev=161.40' Storage=0 cf Inflow=0.84 cfs 0.061 af
Discarded=0.84 cfs 0.061 af Primary=0.00 cfs 0.000 af Outflow=0.84 cfs 0.061 af

Link DP-1: Reservoir and Swimming Area Inflow=1.65 cfs 0.166 af
Primary=1.65 cfs 0.166 af

Link DP-2: Ditch Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 5.416 ac Runoff Volume = 0.227 af Average Runoff Depth = 0.50"
59.60% Pervious = 3.228 ac 40.40% Impervious = 2.188 ac

Summary for Subcatchment 1A: Subcatchment 1 Minus Parking Lot

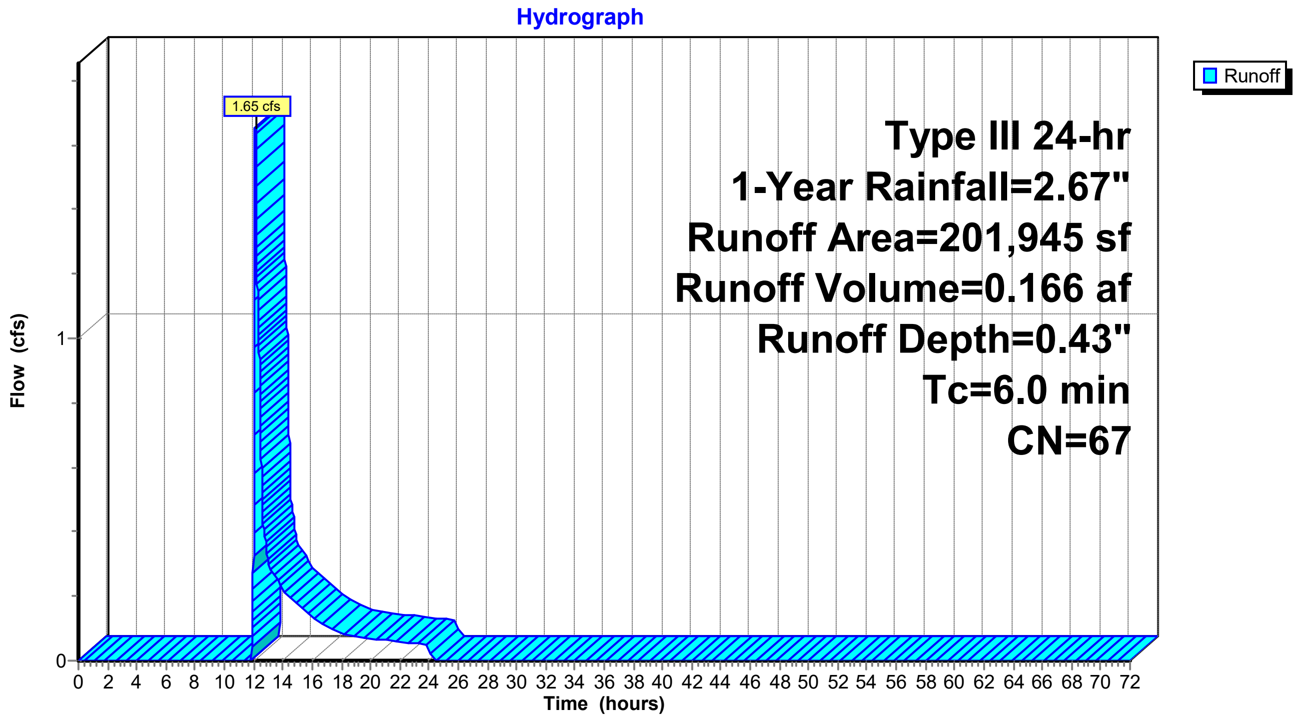
Runoff = 1.65 cfs @ 12.11 hrs, Volume= 0.166 af, Depth= 0.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.67"

	Area (sf)	CN	Description
	13,237	30	Brush, Good, HSG A
*	44,830	63	Beach Sand, HSG A
	56,001	39	>75% Grass cover, Good, HSG A
	19,764	98	Impervious Surface, HSG A
*	1,800	98	Porous Pavement, HSG A
	52,292	98	Water Surface, HSG A
*	6,010	96	Stone Dust, HSG A
*	8,011	39	Permeable Playground Surface, Good, HSG A
	201,945	67	Weighted Average
	128,089		63.43% Pervious Area
	73,856		36.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1A: Subcatchment 1 Minus Parking Lot



Summary for Subcatchment 1B: Area Draining to Parking Lot

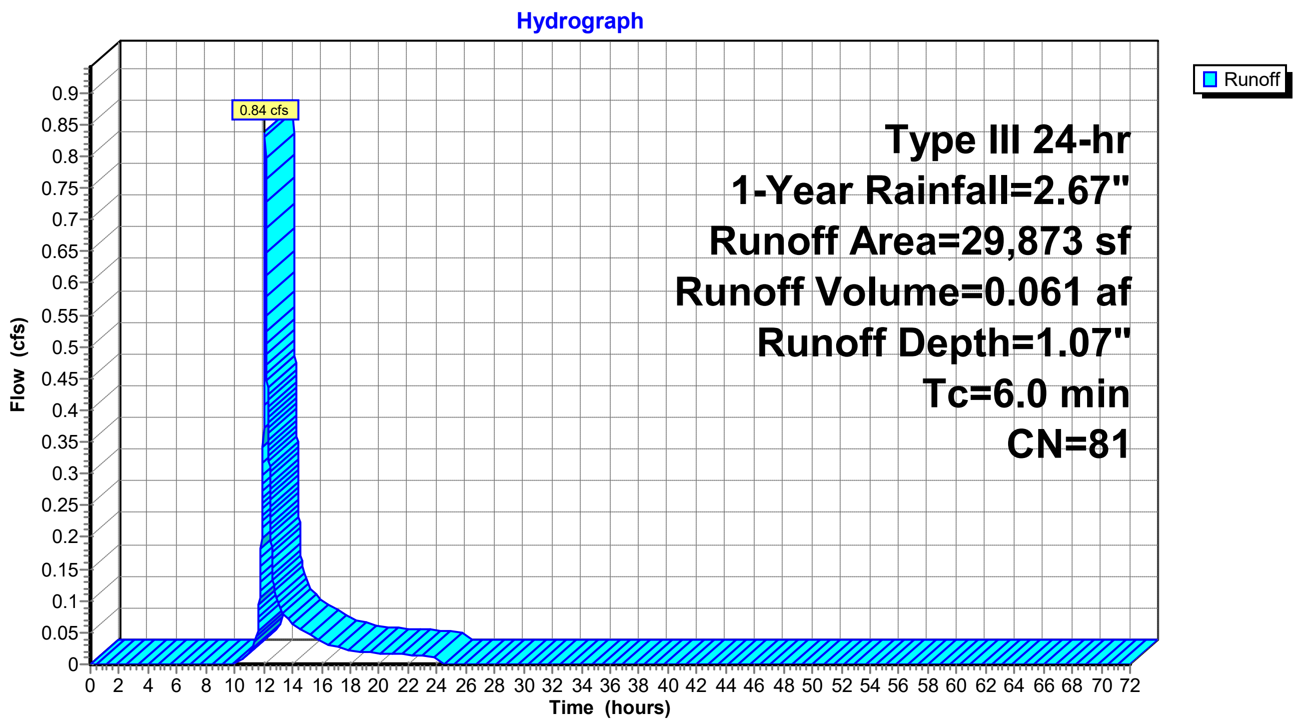
Runoff = 0.84 cfs @ 12.09 hrs, Volume= 0.061 af, Depth= 1.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.67"

	Area (sf)	CN	Description
	8,411	39	>75% Grass cover, Good, HSG A
	574	98	Impervious Surface, HSG A
*	20,888	98	Porous Pavement, HSG A
	29,873	81	Weighted Average
	8,411		28.16% Pervious Area
	21,462		71.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1B: Area Draining to Parking Lot



Summary for Subcatchment 2: Subcatchment 2

[45] Hint: Runoff=Zero

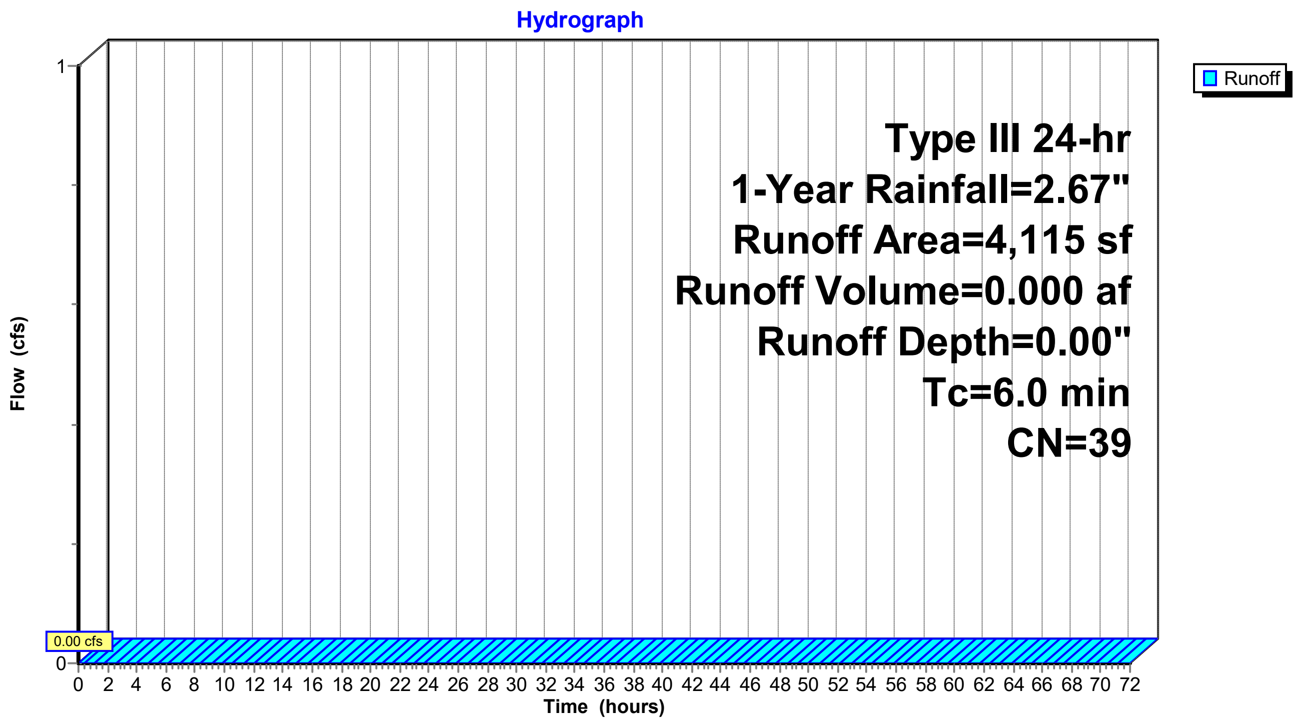
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Year Rainfall=2.67"

Area (sf)	CN	Description
4,115	39	>75% Grass cover, Good, HSG A
4,115		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2



Summary for Pond P1: Porous Pavement

Inflow Area = 0.686 ac, 71.84% Impervious, Inflow Depth = 1.07" for 1-Year event
Inflow = 0.84 cfs @ 12.09 hrs, Volume= 0.061 af
Outflow = 0.84 cfs @ 12.09 hrs, Volume= 0.061 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.84 cfs @ 12.09 hrs, Volume= 0.061 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 161.40' @ 12.09 hrs Surf.Area= 21,411 sf Storage= 0 cf
Flood Elev= 164.00' Surf.Area= 42,822 sf Storage= 11,383 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (849.0 - 849.0)

Volume	Invert	Avail.Storage	Storage Description
#1	161.40'	7,099 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 17,771 cf Overall - 23 cf Embedded = 17,749 cf x 40.0% Voids
#2	162.23'	4,261 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#3	161.73'	23 cf	**4.0" Round Pipe Storage** Inside #1 L= 258.0'
		11,383 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
161.40	21,411	0	0
162.23	21,411	17,771	17,771

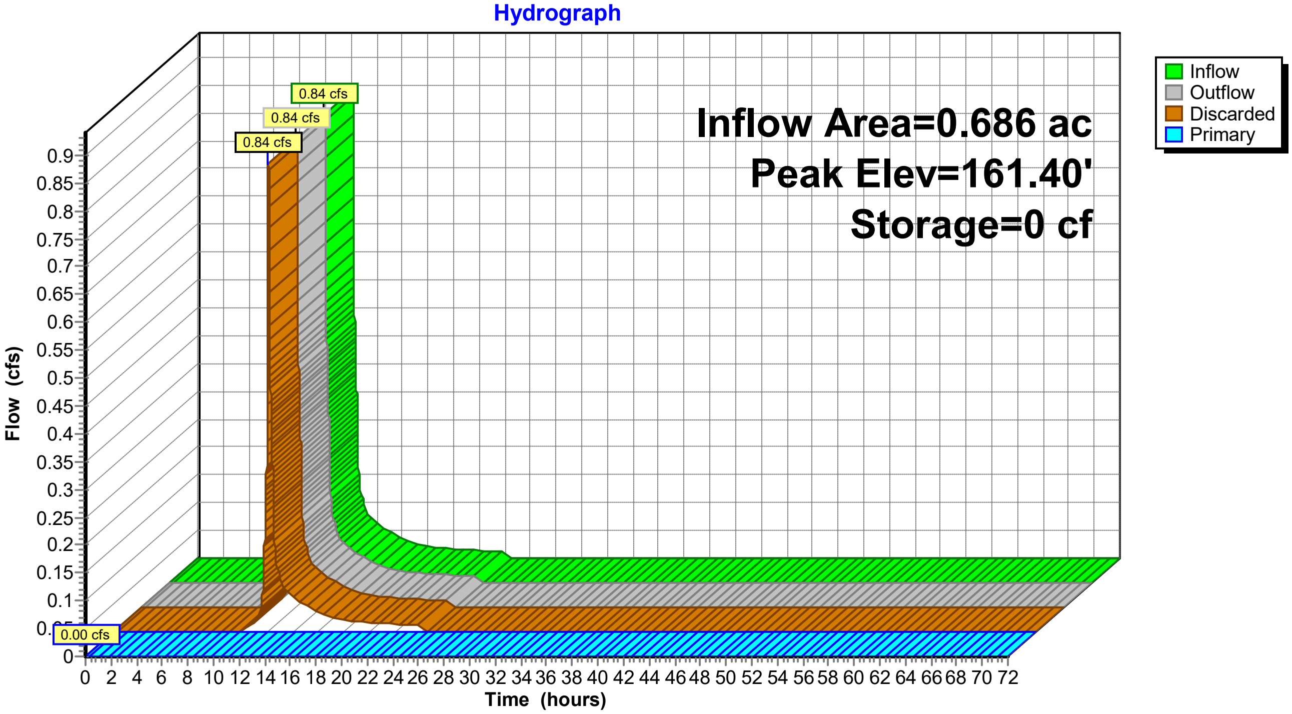
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
162.23	21,411	0.0	0	0
162.48	21,411	40.0	2,141	2,141
162.81	21,411	30.0	2,120	4,261

Device	Routing	Invert	Outlet Devices
#1	Primary	162.15'	**12.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 162.15' / 162.05' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	161.73'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	161.40'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.19 cfs @ 12.09 hrs HW=161.40' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.40' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond P1: Porous Pavement

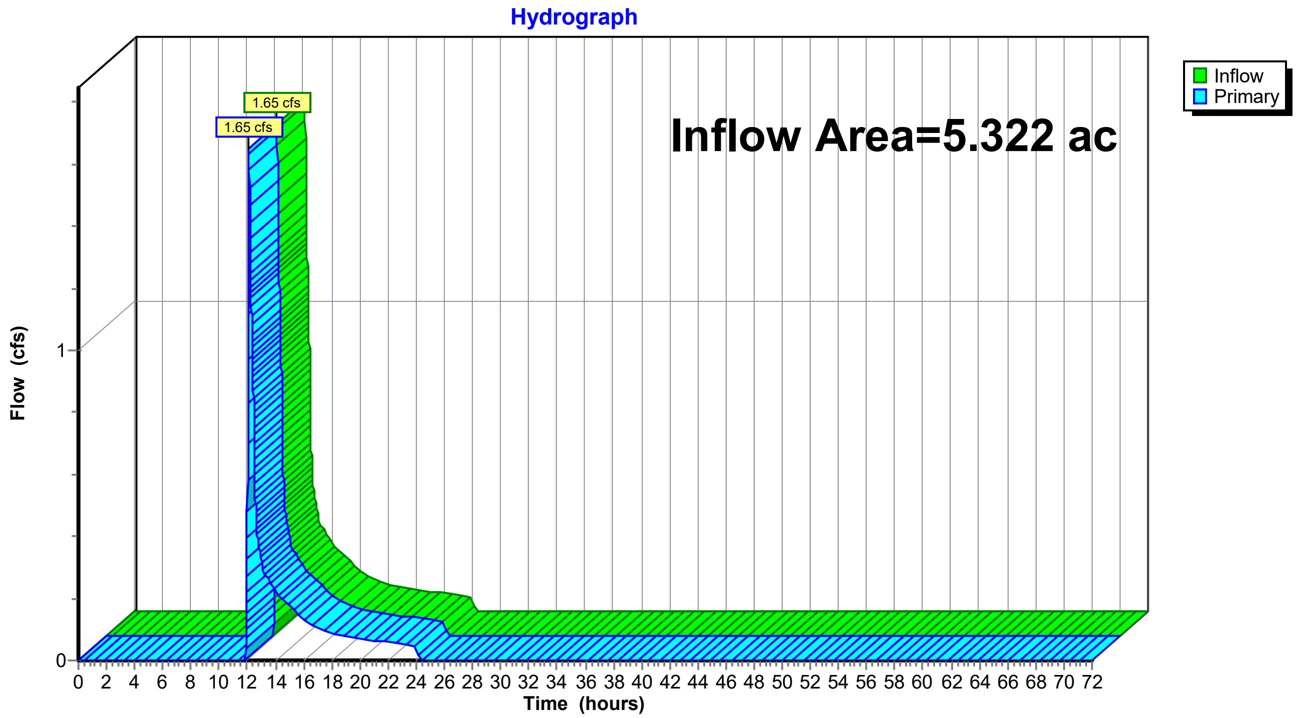


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.322 ac,	41.12% Impervious,	Inflow Depth = 0.37"	for 1-Year event
Inflow =	1.65 cfs @	12.11 hrs, Volume=	0.166 af	
Primary =	1.65 cfs @	12.11 hrs, Volume=	0.166 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

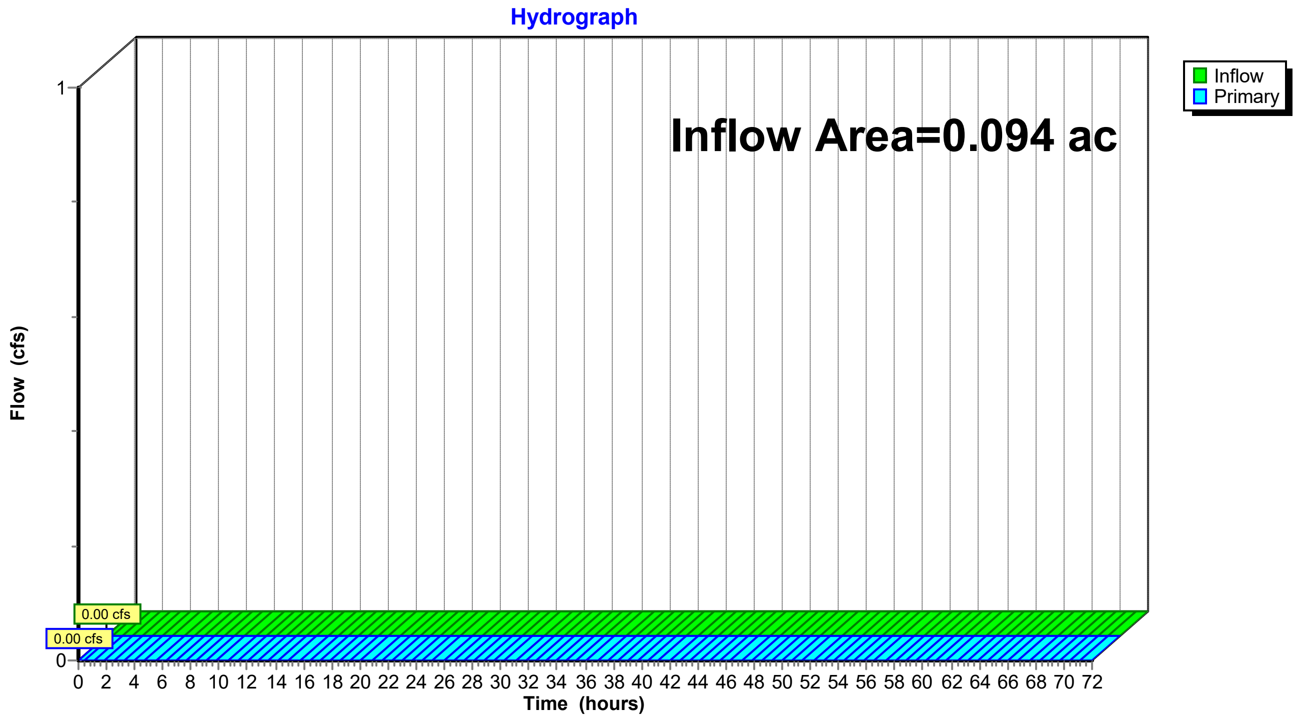


Summary for Link DP-2: Ditch

Inflow Area =	0.094 ac,	0.00% Impervious,	Inflow Depth = 0.00"	for 1-Year event
Inflow =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A: Subcatchment 1 Runoff Area=201,945 sf 36.57% Impervious Runoff Depth=0.69"
Tc=6.0 min CN=67 Runoff=3.15 cfs 0.267 af

Subcatchment 1B: Area Draining to Runoff Area=29,873 sf 71.84% Impervious Runoff Depth=1.48"
Tc=6.0 min CN=81 Runoff=1.18 cfs 0.084 af

Subcatchment 2: Subcatchment 2 Runoff Area=4,115 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=39 Runoff=0.00 cfs 0.000 af

Pond P1: Porous Pavement Peak Elev=161.40' Storage=1 cf Inflow=1.18 cfs 0.084 af
Discarded=1.17 cfs 0.084 af Primary=0.00 cfs 0.000 af Outflow=1.17 cfs 0.084 af

Link DP-1: Reservoir and Swimming Area Inflow=3.15 cfs 0.267 af
Primary=3.15 cfs 0.267 af

Link DP-2: Ditch Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 5.416 ac Runoff Volume = 0.352 af Average Runoff Depth = 0.78"
59.60% Pervious = 3.228 ac 40.40% Impervious = 2.188 ac

Summary for Subcatchment 1A: Subcatchment 1 Minus Parking Lot

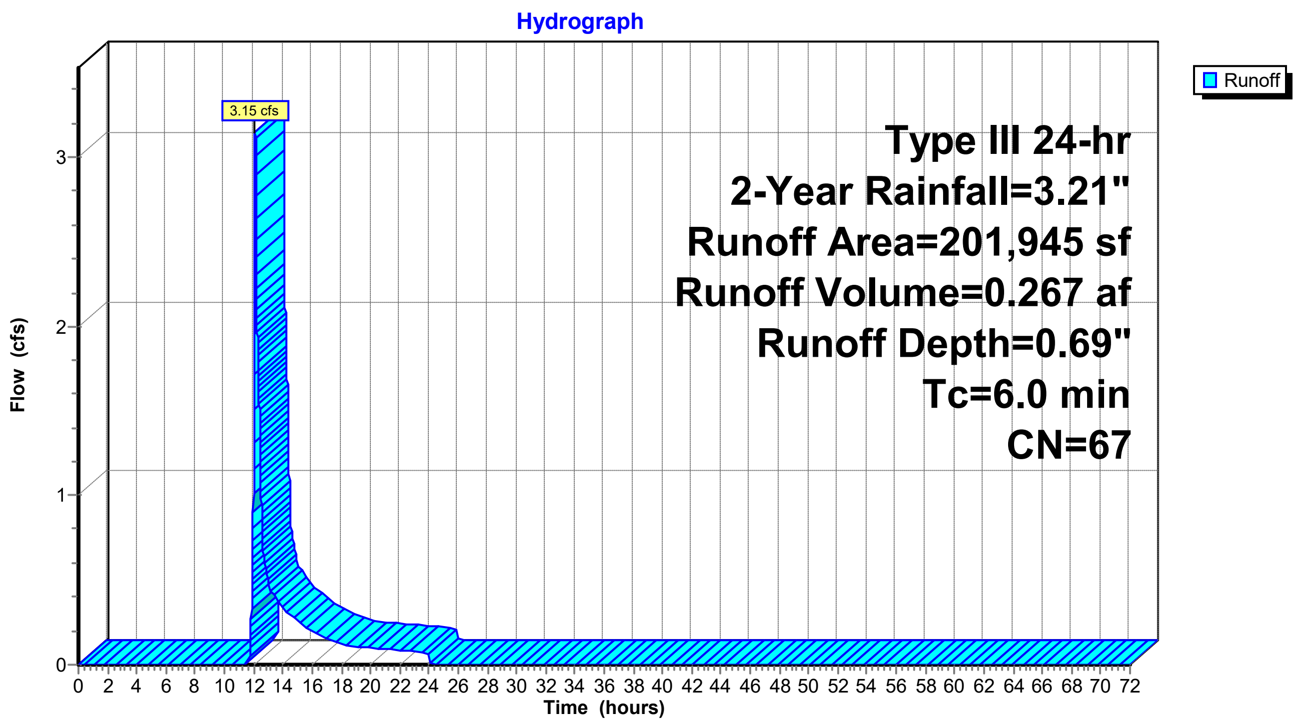
Runoff = 3.15 cfs @ 12.10 hrs, Volume= 0.267 af, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.21"

	Area (sf)	CN	Description
	13,237	30	Brush, Good, HSG A
*	44,830	63	Beach Sand, HSG A
	56,001	39	>75% Grass cover, Good, HSG A
	19,764	98	Impervious Surface, HSG A
*	1,800	98	Porous Pavement, HSG A
	52,292	98	Water Surface, HSG A
*	6,010	96	Stone Dust, HSG A
*	8,011	39	Permeable Playground Surface, Good, HSG A
	201,945	67	Weighted Average
	128,089		63.43% Pervious Area
	73,856		36.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1A: Subcatchment 1 Minus Parking Lot



Summary for Subcatchment 1B: Area Draining to Parking Lot

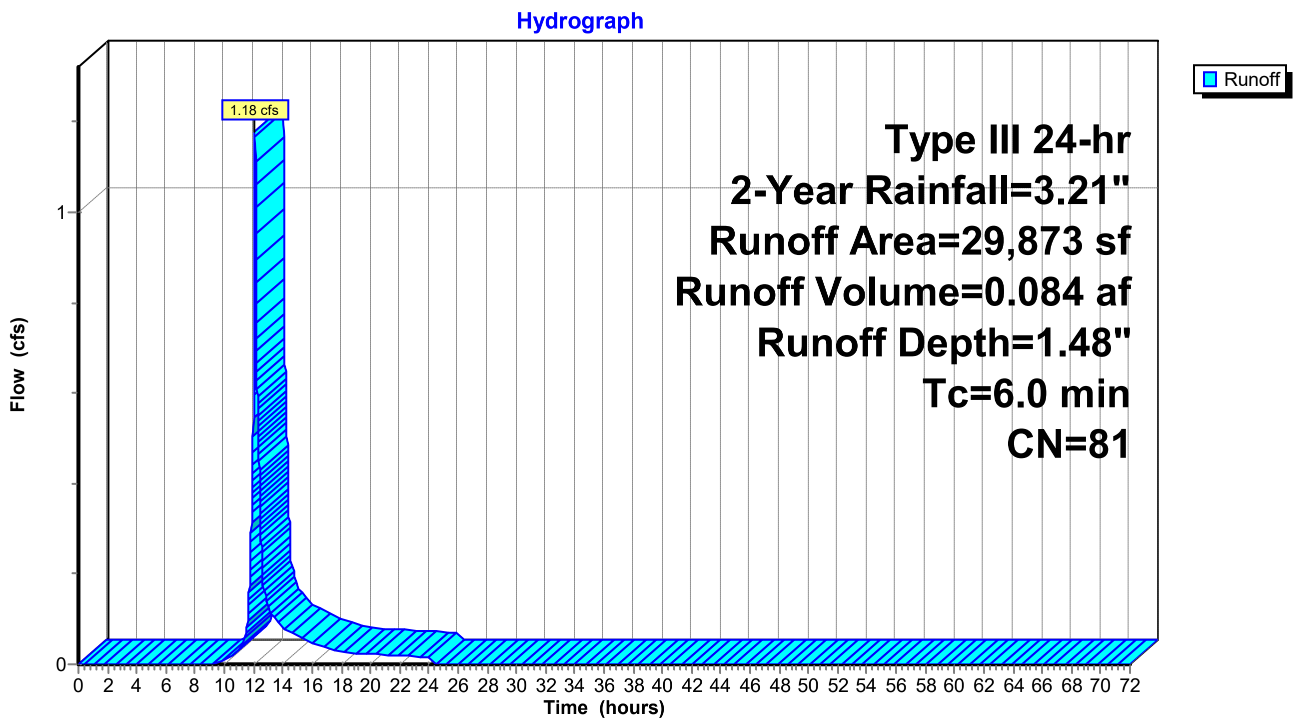
Runoff = 1.18 cfs @ 12.09 hrs, Volume= 0.084 af, Depth= 1.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.21"

	Area (sf)	CN	Description
	8,411	39	>75% Grass cover, Good, HSG A
	574	98	Impervious Surface, HSG A
*	20,888	98	Porous Pavement, HSG A
	29,873	81	Weighted Average
	8,411		28.16% Pervious Area
	21,462		71.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1B: Area Draining to Parking Lot



Summary for Subcatchment 2: Subcatchment 2

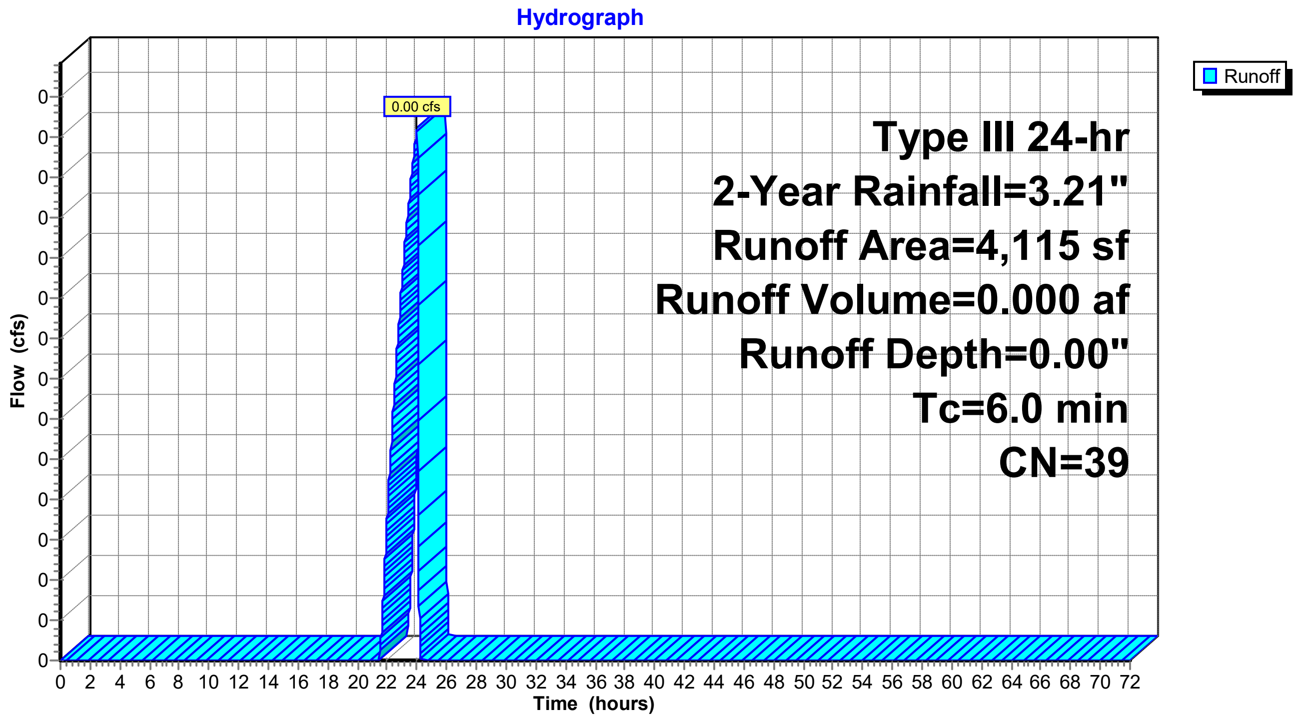
Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.21"

Area (sf)	CN	Description
4,115	39	>75% Grass cover, Good, HSG A
4,115		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2



Summary for Pond P1: Porous Pavement

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=547)

Inflow Area = 0.686 ac, 71.84% Impervious, Inflow Depth = 1.48" for 2-Year event
Inflow = 1.18 cfs @ 12.09 hrs, Volume= 0.084 af
Outflow = 1.17 cfs @ 12.10 hrs, Volume= 0.084 af, Atten= 0%, Lag= 0.4 min
Discarded = 1.17 cfs @ 12.10 hrs, Volume= 0.084 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 161.40' @ 12.10 hrs Surf.Area= 21,411 sf Storage= 1 cf
Flood Elev= 164.00' Surf.Area= 42,822 sf Storage= 11,383 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (839.4 - 839.4)

Volume	Invert	Avail.Storage	Storage Description
#1	161.40'	7,099 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 17,771 cf Overall - 23 cf Embedded = 17,749 cf x 40.0% Voids
#2	162.23'	4,261 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#3	161.73'	23 cf	**4.0" Round Pipe Storage** Inside #1 L= 258.0'
		11,383 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
161.40	21,411	0	0
162.23	21,411	17,771	17,771

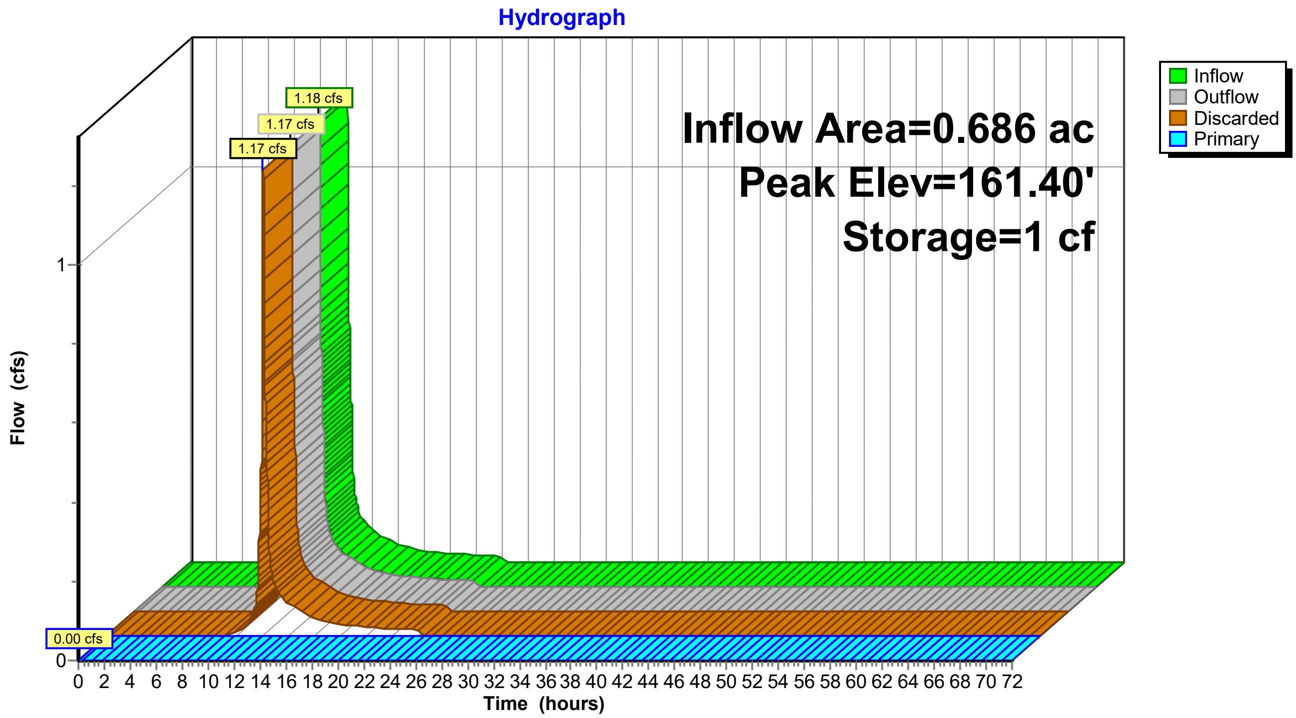
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
162.23	21,411	0.0	0	0
162.48	21,411	40.0	2,141	2,141
162.81	21,411	30.0	2,120	4,261

Device	Routing	Invert	Outlet Devices
#1	Primary	162.15'	**12.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 162.15' / 162.05' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	161.73'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	161.40'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.19 cfs @ 12.10 hrs HW=161.40' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.40' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond P1: Porous Pavement

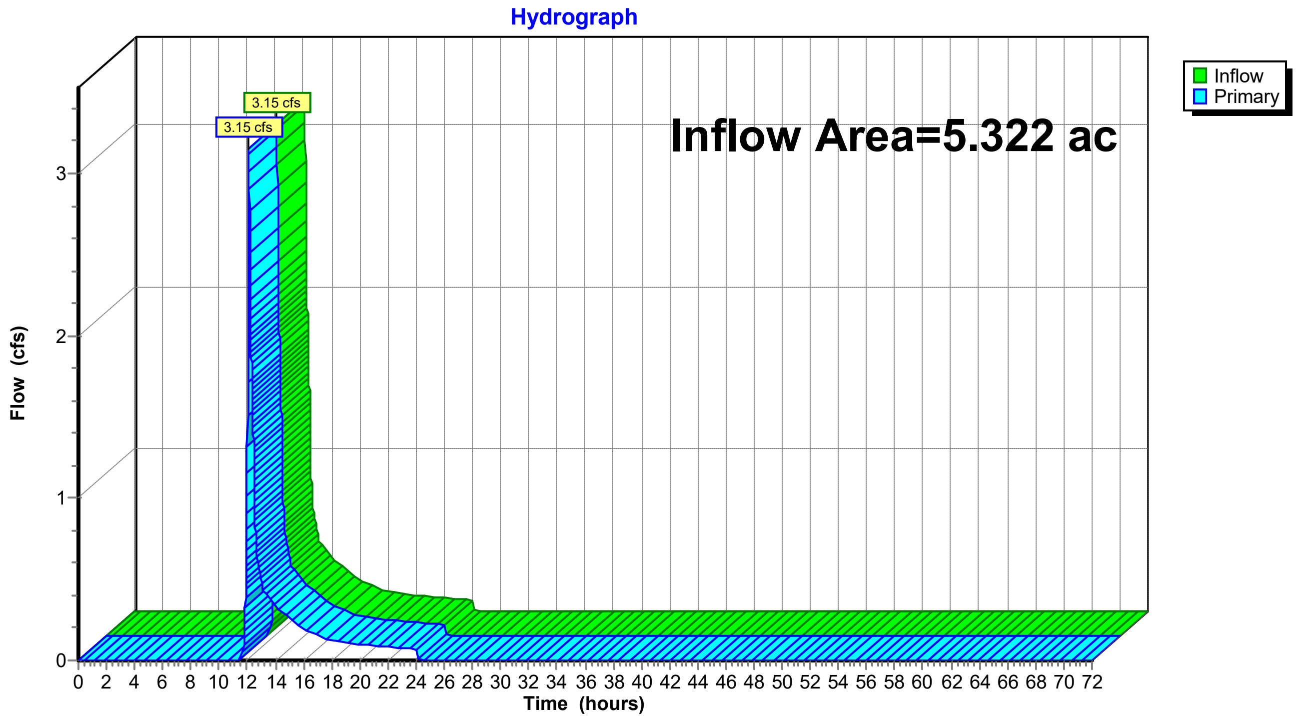


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area = 5.322 ac, 41.12% Impervious, Inflow Depth = 0.60" for 2-Year event
Inflow = 3.15 cfs @ 12.10 hrs, Volume= 0.267 af
Primary = 3.15 cfs @ 12.10 hrs, Volume= 0.267 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

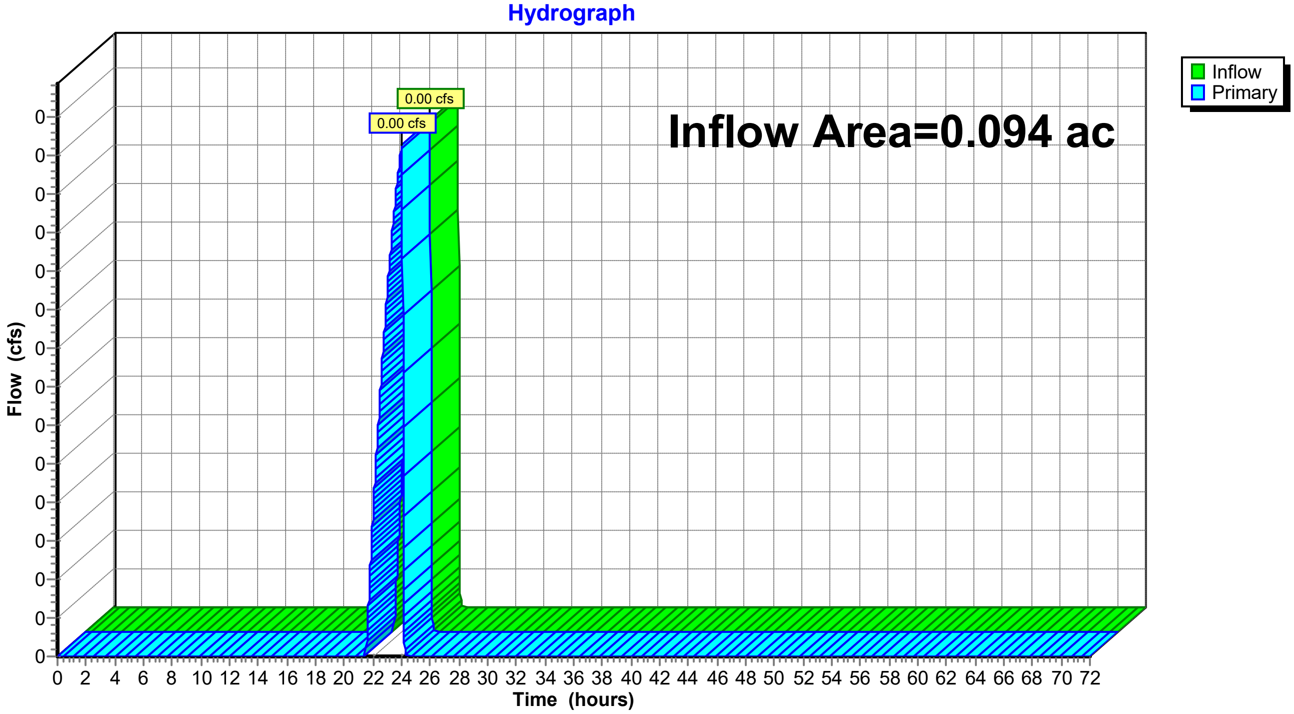


Summary for Link DP-2: Ditch

Inflow Area =	0.094 ac,	0.00% Impervious, Inflow Depth = 0.00"	for 2-Year event	
Inflow =	0.00 cfs @	24.01 hrs, Volume=	0.000 af	
Primary =	0.00 cfs @	24.01 hrs, Volume=	0.000 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A: Subcatchment 1 Runoff Area=201,945 sf 36.57% Impervious Runoff Depth=1.71"
Tc=6.0 min CN=67 Runoff=8.92 cfs 0.659 af

Subcatchment 1B: Area Draining to Runoff Area=29,873 sf 71.84% Impervious Runoff Depth=2.86"
Tc=6.0 min CN=81 Runoff=2.30 cfs 0.164 af

Subcatchment 2: Subcatchment 2 Runoff Area=4,115 sf 0.00% Impervious Runoff Depth=0.17"
Tc=6.0 min CN=39 Runoff=0.00 cfs 0.001 af

Pond P1: Porous Pavement Peak Elev=161.46' Storage=515 cf Inflow=2.30 cfs 0.164 af
Discarded=1.19 cfs 0.164 af Primary=0.00 cfs 0.000 af Outflow=1.19 cfs 0.164 af

Link DP-1: Reservoir and Swimming Area Inflow=8.92 cfs 0.659 af
Primary=8.92 cfs 0.659 af

Link DP-2: Ditch Inflow=0.00 cfs 0.001 af
Primary=0.00 cfs 0.001 af

Total Runoff Area = 5.416 ac Runoff Volume = 0.824 af Average Runoff Depth = 1.83"
59.60% Pervious = 3.228 ac 40.40% Impervious = 2.188 ac

Summary for Subcatchment 1A: Subcatchment 1 Minus Parking Lot

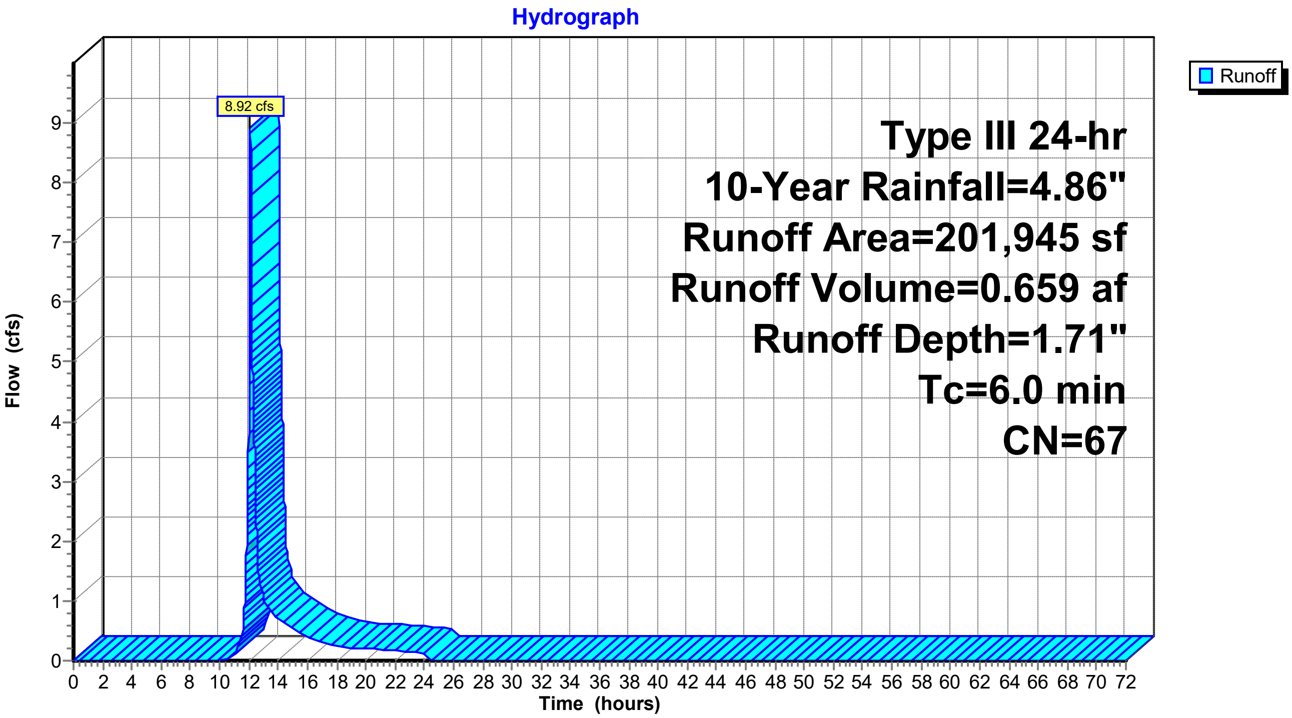
Runoff = 8.92 cfs @ 12.09 hrs, Volume= 0.659 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
	13,237	30	Brush, Good, HSG A
*	44,830	63	Beach Sand, HSG A
	56,001	39	>75% Grass cover, Good, HSG A
	19,764	98	Impervious Surface, HSG A
*	1,800	98	Porous Pavement, HSG A
	52,292	98	Water Surface, HSG A
*	6,010	96	Stone Dust, HSG A
*	8,011	39	Permeable Playground Surface, Good, HSG A
	201,945	67	Weighted Average
	128,089		63.43% Pervious Area
	73,856		36.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1A: Subcatchment 1 Minus Parking Lot



Summary for Subcatchment 1B: Area Draining to Parking Lot

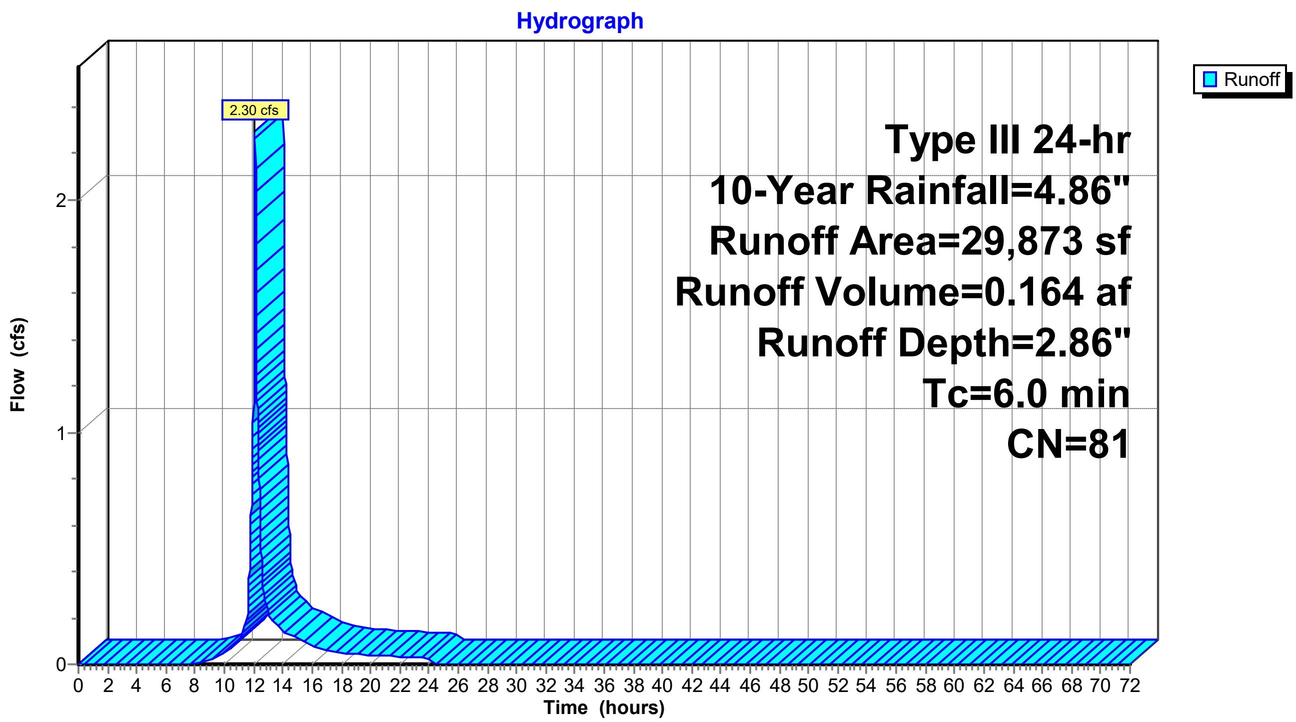
Runoff = 2.30 cfs @ 12.09 hrs, Volume= 0.164 af, Depth= 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.86"

	Area (sf)	CN	Description
	8,411	39	>75% Grass cover, Good, HSG A
	574	98	Impervious Surface, HSG A
*	20,888	98	Porous Pavement, HSG A
	29,873	81	Weighted Average
	8,411		28.16% Pervious Area
	21,462		71.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1B: Area Draining to Parking Lot



Summary for Subcatchment 2: Subcatchment 2

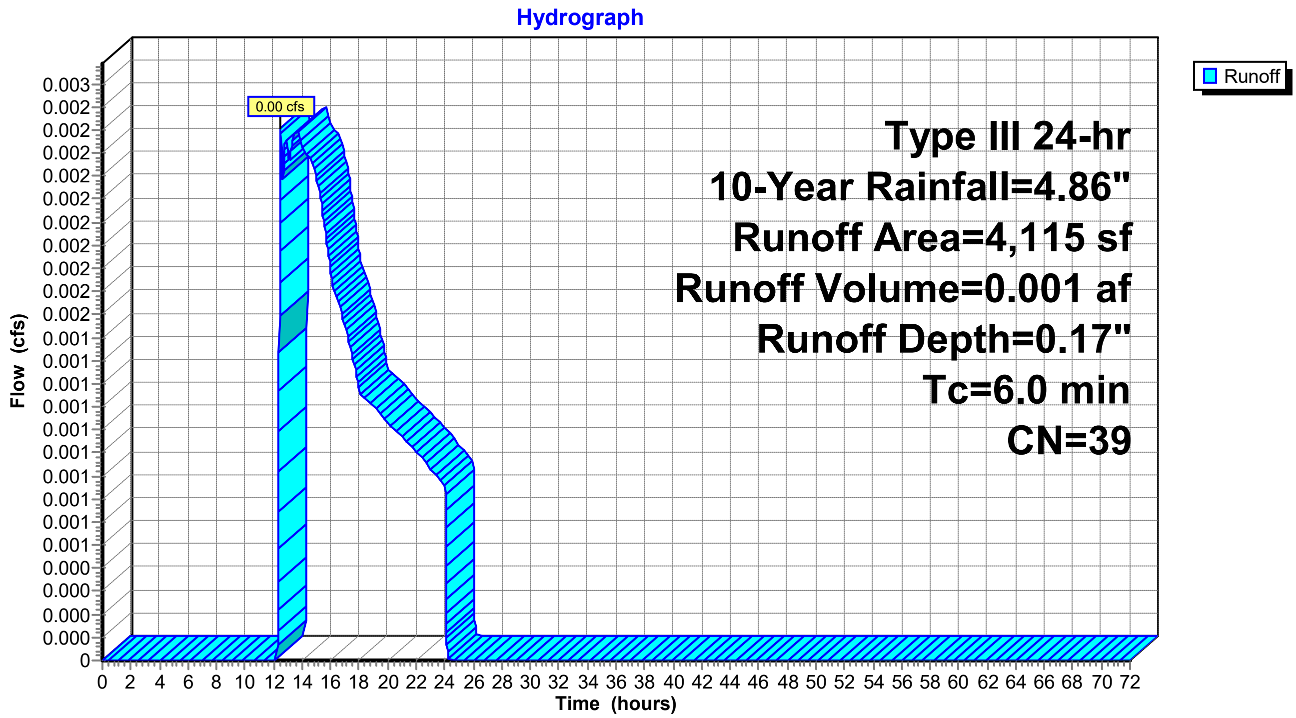
Runoff = 0.00 cfs @ 12.51 hrs, Volume= 0.001 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.86"

Area (sf)	CN	Description
4,115	39	>75% Grass cover, Good, HSG A
4,115		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2



Summary for Pond P1: Porous Pavement

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=576)

Inflow Area =	0.686 ac, 71.84% Impervious, Inflow Depth = 2.86" for 10-Year event			
Inflow =	2.30 cfs @	12.09 hrs, Volume=	0.164 af	
Outflow =	1.19 cfs @	12.09 hrs, Volume=	0.164 af,	Atten= 48%, Lag= 0.1 min
Discarded =	1.19 cfs @	12.09 hrs, Volume=	0.164 af	
Primary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 161.46' @ 12.23 hrs Surf.Area= 21,411 sf Storage= 515 cf
Flood Elev= 164.00' Surf.Area= 42,822 sf Storage= 11,383 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.6 min (821.9 - 820.3)

Volume	Invert	Avail.Storage	Storage Description
#1	161.40'	7,099 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 17,771 cf Overall - 23 cf Embedded = 17,749 cf x 40.0% Voids
#2	162.23'	4,261 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#3	161.73'	23 cf	**4.0" Round Pipe Storage** Inside #1 L= 258.0'
		11,383 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
161.40	21,411	0	0
162.23	21,411	17,771	17,771

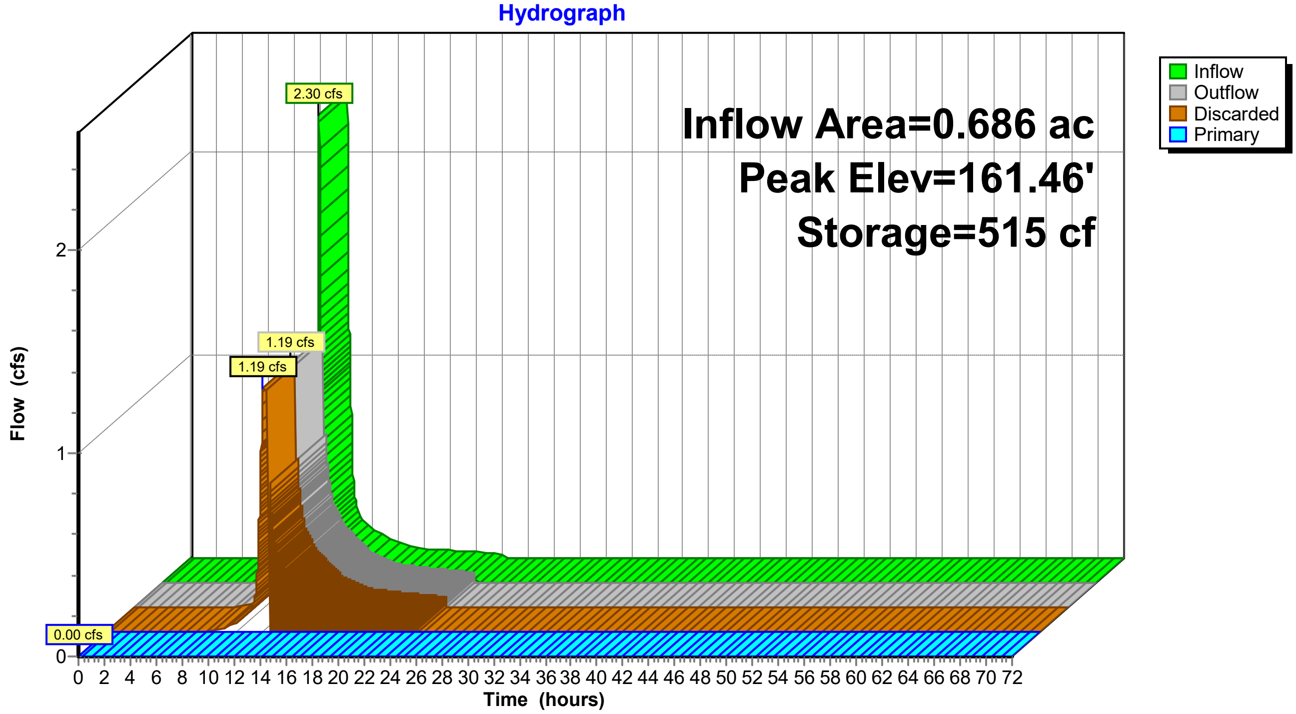
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
162.23	21,411	0.0	0	0
162.48	21,411	40.0	2,141	2,141
162.81	21,411	30.0	2,120	4,261

Device	Routing	Invert	Outlet Devices
#1	Primary	162.15'	**12.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 162.15' / 162.05' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	161.73'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	161.40'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.19 cfs @ 12.09 hrs HW=161.43' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.40' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond P1: Porous Pavement

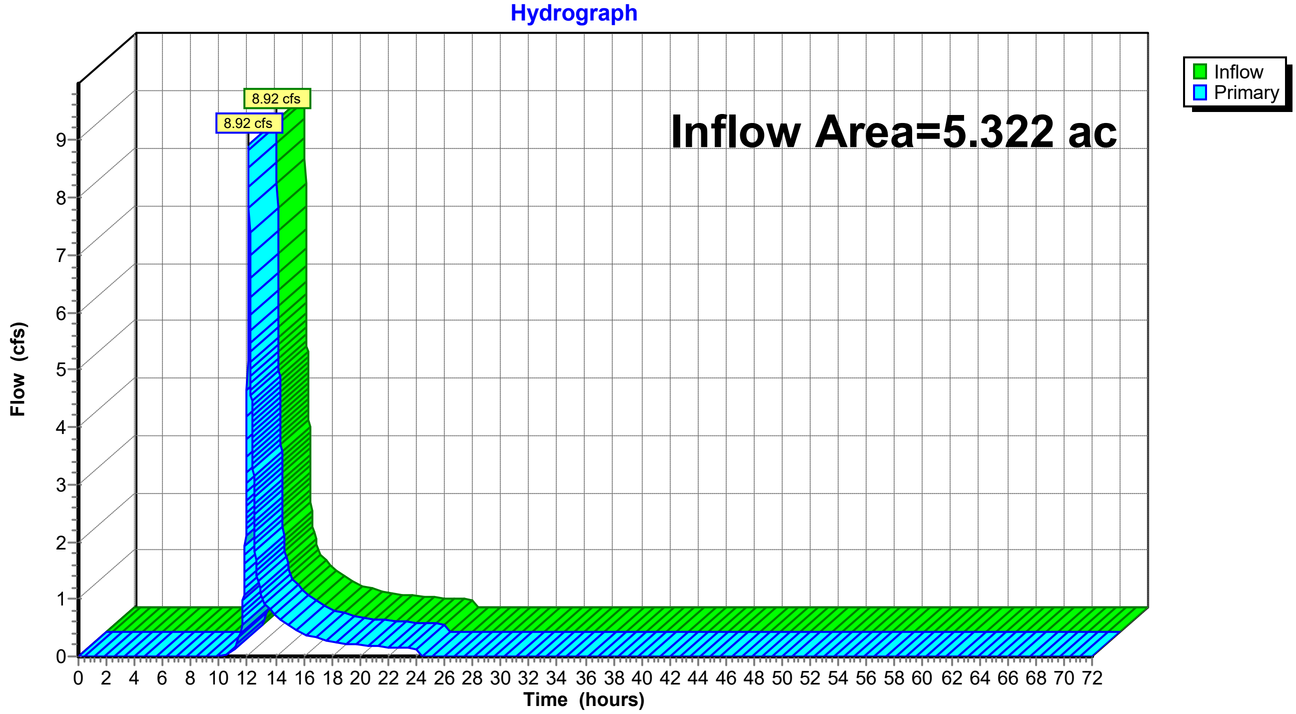


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.322 ac,	41.12% Impervious,	Inflow Depth = 1.49"	for 10-Year event
Inflow =	8.92 cfs @	12.09 hrs, Volume=	0.659 af	
Primary =	8.92 cfs @	12.09 hrs, Volume=	0.659 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

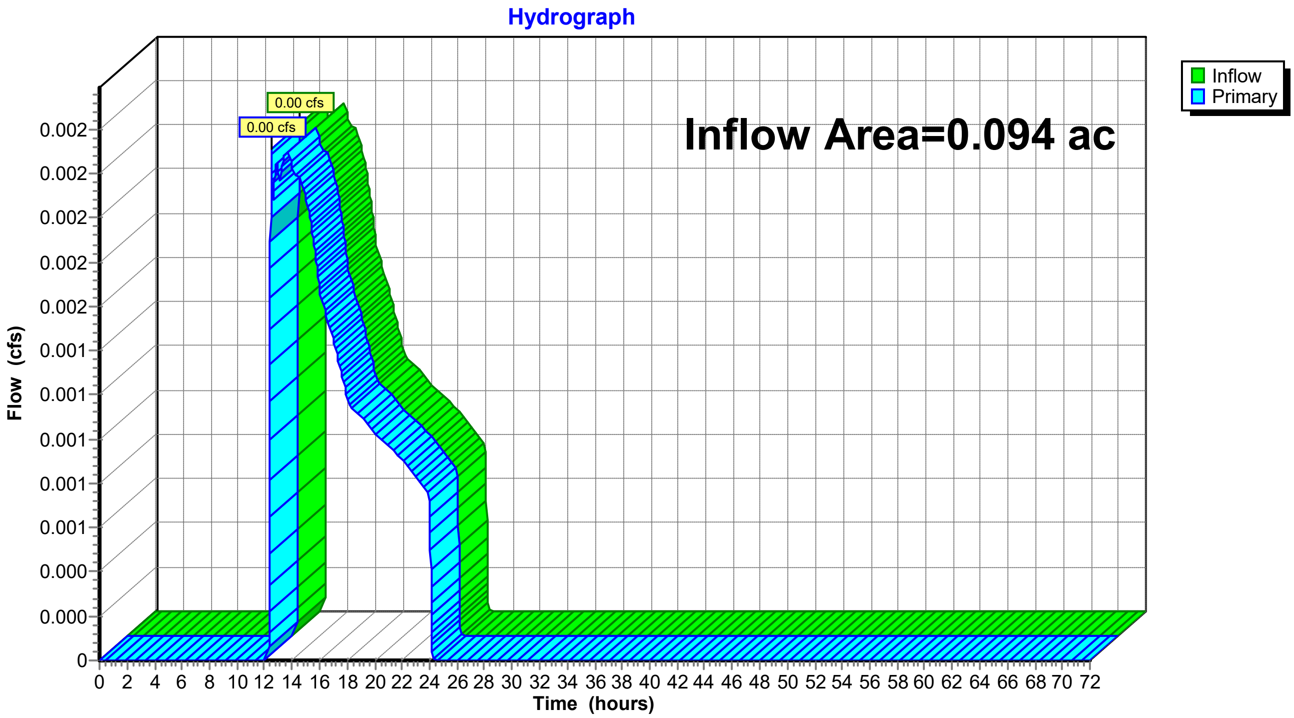


Summary for Link DP-2: Ditch

Inflow Area =	0.094 ac,	0.00% Impervious,	Inflow Depth = 0.17"	for 10-Year event		
Inflow =	0.00 cfs @	12.51 hrs,	Volume=	0.001 af		
Primary =	0.00 cfs @	12.51 hrs,	Volume=	0.001 af,	Atten= 0%,	Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A: Subcatchment 1 Runoff Area=201,945 sf 36.57% Impervious Runoff Depth=2.66"
Tc=6.0 min CN=67 Runoff=14.29 cfs 1.027 af

Subcatchment 1B: Area Draining to Runoff Area=29,873 sf 71.84% Impervious Runoff Depth=4.04"
Tc=6.0 min CN=81 Runoff=3.22 cfs 0.231 af

Subcatchment 2: Subcatchment 2 Runoff Area=4,115 sf 0.00% Impervious Runoff Depth=0.50"
Tc=6.0 min CN=39 Runoff=0.02 cfs 0.004 af

Pond P1: Porous Pavement Peak Elev=161.55' Storage=1,280 cf Inflow=3.22 cfs 0.231 af
Discarded=1.19 cfs 0.231 af Primary=0.00 cfs 0.000 af Outflow=1.19 cfs 0.231 af

Link DP-1: Reservoir and Swimming Area Inflow=14.29 cfs 1.027 af
Primary=14.29 cfs 1.027 af

Link DP-2: Ditch Inflow=0.02 cfs 0.004 af
Primary=0.02 cfs 0.004 af

Total Runoff Area = 5.416 ac Runoff Volume = 1.262 af Average Runoff Depth = 2.80"
59.60% Pervious = 3.228 ac 40.40% Impervious = 2.188 ac

Summary for Subcatchment 1A: Subcatchment 1 Minus Parking Lot

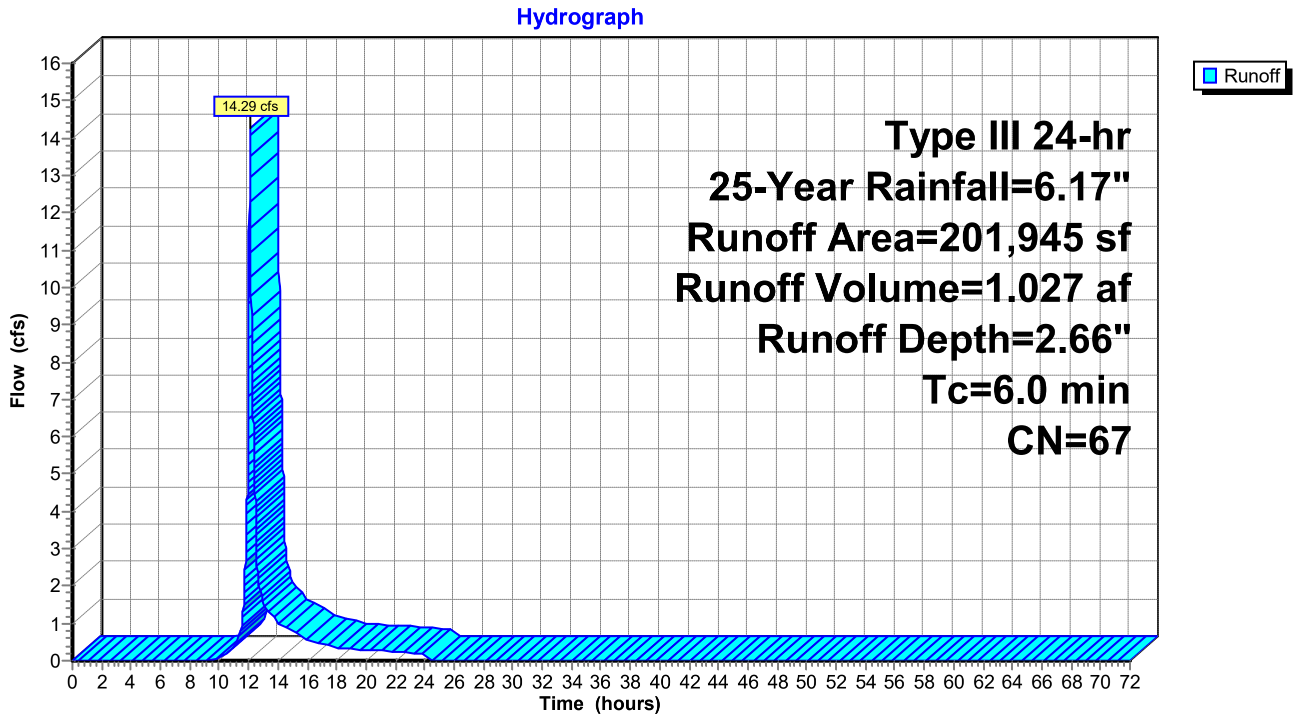
Runoff = 14.29 cfs @ 12.09 hrs, Volume= 1.027 af, Depth= 2.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.17"

	Area (sf)	CN	Description
	13,237	30	Brush, Good, HSG A
*	44,830	63	Beach Sand, HSG A
	56,001	39	>75% Grass cover, Good, HSG A
	19,764	98	Impervious Surface, HSG A
*	1,800	98	Porous Pavement, HSG A
	52,292	98	Water Surface, HSG A
*	6,010	96	Stone Dust, HSG A
*	8,011	39	Permeable Playground Surface, Good, HSG A
	201,945	67	Weighted Average
	128,089		63.43% Pervious Area
	73,856		36.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1A: Subcatchment 1 Minus Parking Lot



Summary for Subcatchment 1B: Area Draining to Parking Lot

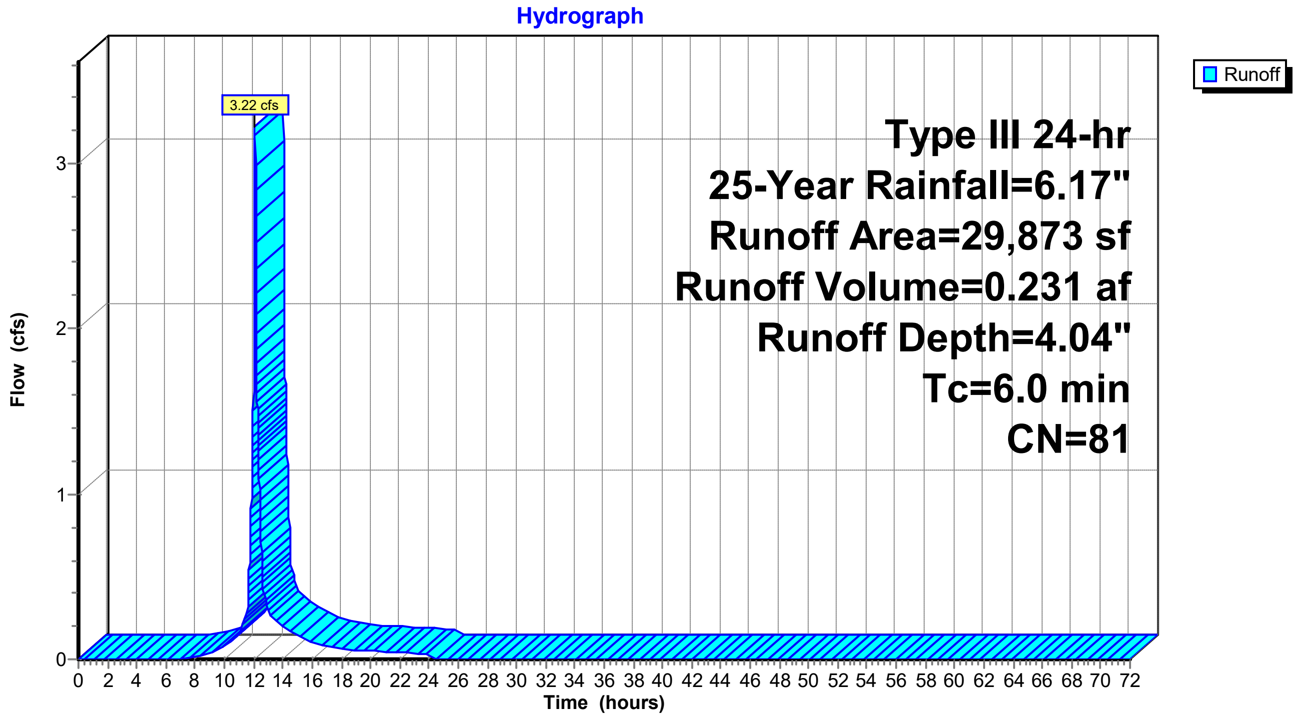
Runoff = 3.22 cfs @ 12.09 hrs, Volume= 0.231 af, Depth= 4.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.17"

	Area (sf)	CN	Description
	8,411	39	>75% Grass cover, Good, HSG A
	574	98	Impervious Surface, HSG A
*	20,888	98	Porous Pavement, HSG A
	29,873	81	Weighted Average
	8,411		28.16% Pervious Area
	21,462		71.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1B: Area Draining to Parking Lot



Summary for Subcatchment 2: Subcatchment 2

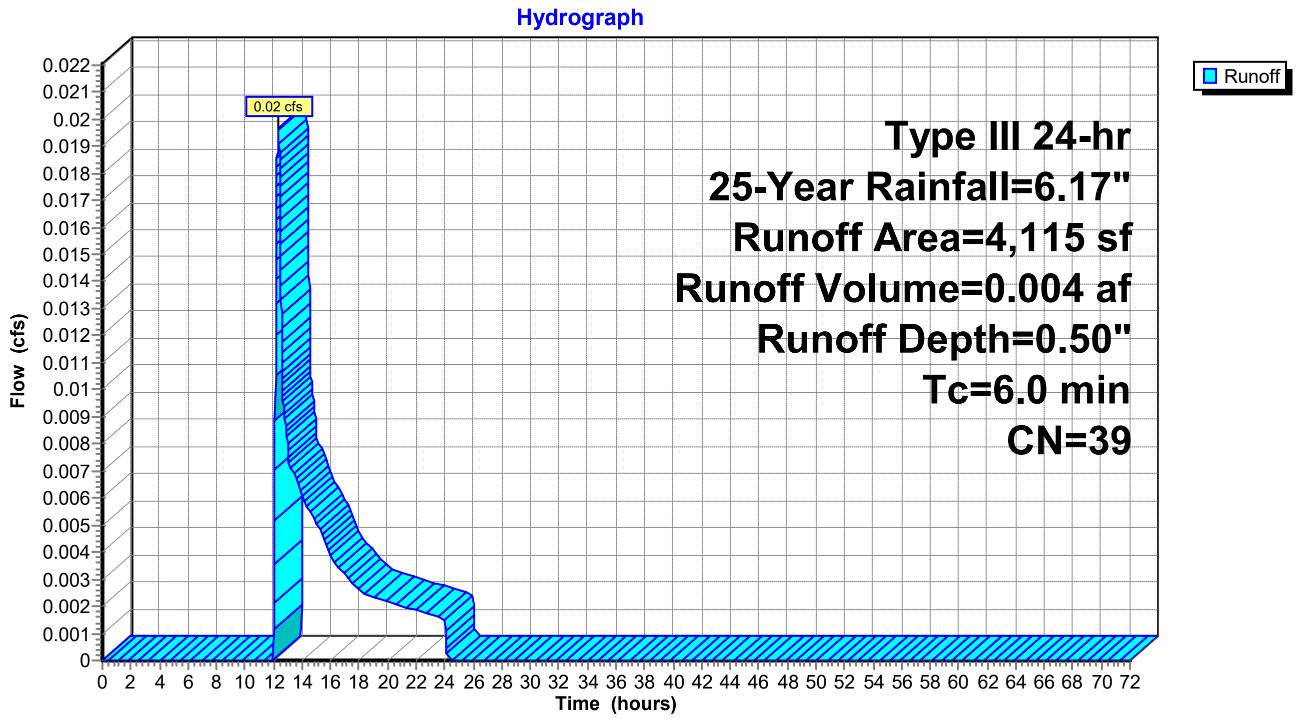
Runoff = 0.02 cfs @ 12.33 hrs, Volume= 0.004 af, Depth= 0.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=6.17"

Area (sf)	CN	Description
4,115	39	>75% Grass cover, Good, HSG A
4,115		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2



Summary for Pond P1: Porous Pavement

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=560)

Inflow Area = 0.686 ac, 71.84% Impervious, Inflow Depth = 4.04" for 25-Year event
Inflow = 3.22 cfs @ 12.09 hrs, Volume= 0.231 af
Outflow = 1.19 cfs @ 12.04 hrs, Volume= 0.231 af, Atten= 63%, Lag= 0.0 min
Discarded = 1.19 cfs @ 12.04 hrs, Volume= 0.231 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 161.55' @ 12.35 hrs Surf.Area= 21,411 sf Storage= 1,280 cf
Flood Elev= 164.00' Surf.Area= 42,822 sf Storage= 11,383 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 4.6 min (815.0 - 810.4)

Volume	Invert	Avail.Storage	Storage Description
#1	161.40'	7,099 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 17,771 cf Overall - 23 cf Embedded = 17,749 cf x 40.0% Voids
#2	162.23'	4,261 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#3	161.73'	23 cf	**4.0" Round Pipe Storage** Inside #1 L= 258.0'
		11,383 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
161.40	21,411	0	0
162.23	21,411	17,771	17,771

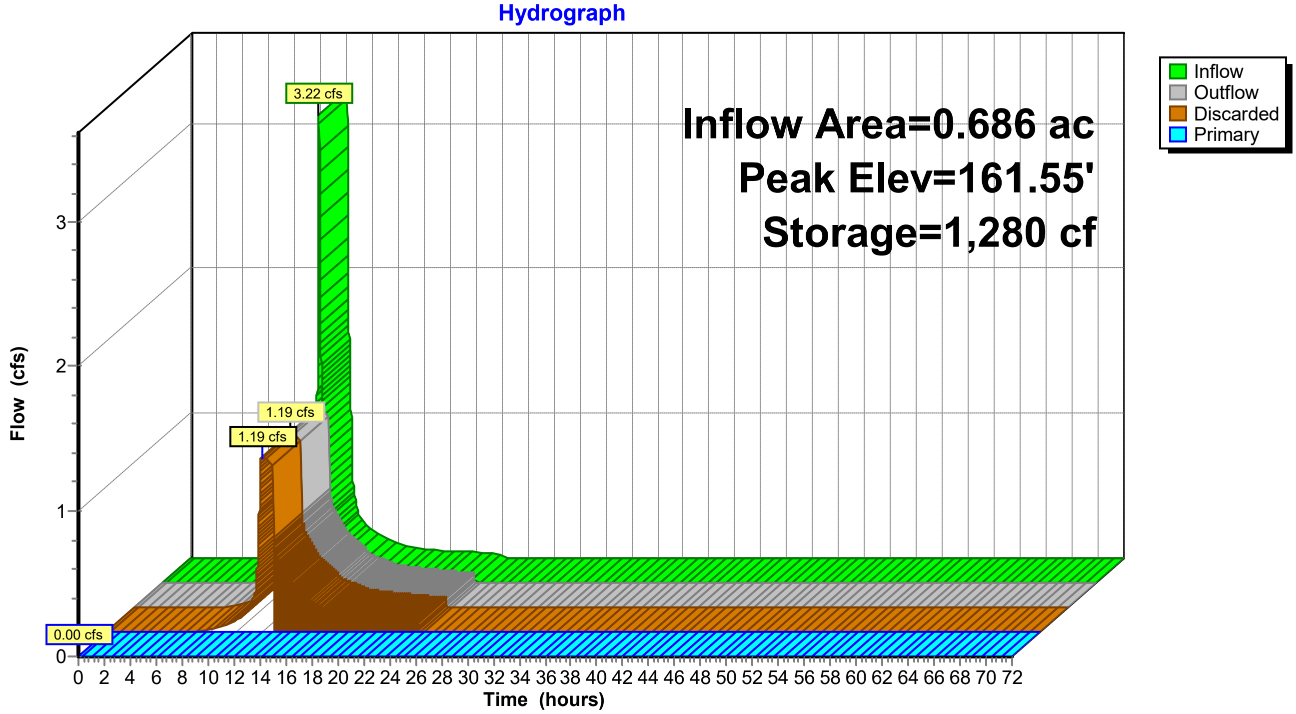
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
162.23	21,411	0.0	0	0
162.48	21,411	40.0	2,141	2,141
162.81	21,411	30.0	2,120	4,261

Device	Routing	Invert	Outlet Devices
#1	Primary	162.15'	**12.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 162.15' / 162.05' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	161.73'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	161.40'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.19 cfs @ 12.04 hrs HW=161.43' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.40' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond P1: Porous Pavement

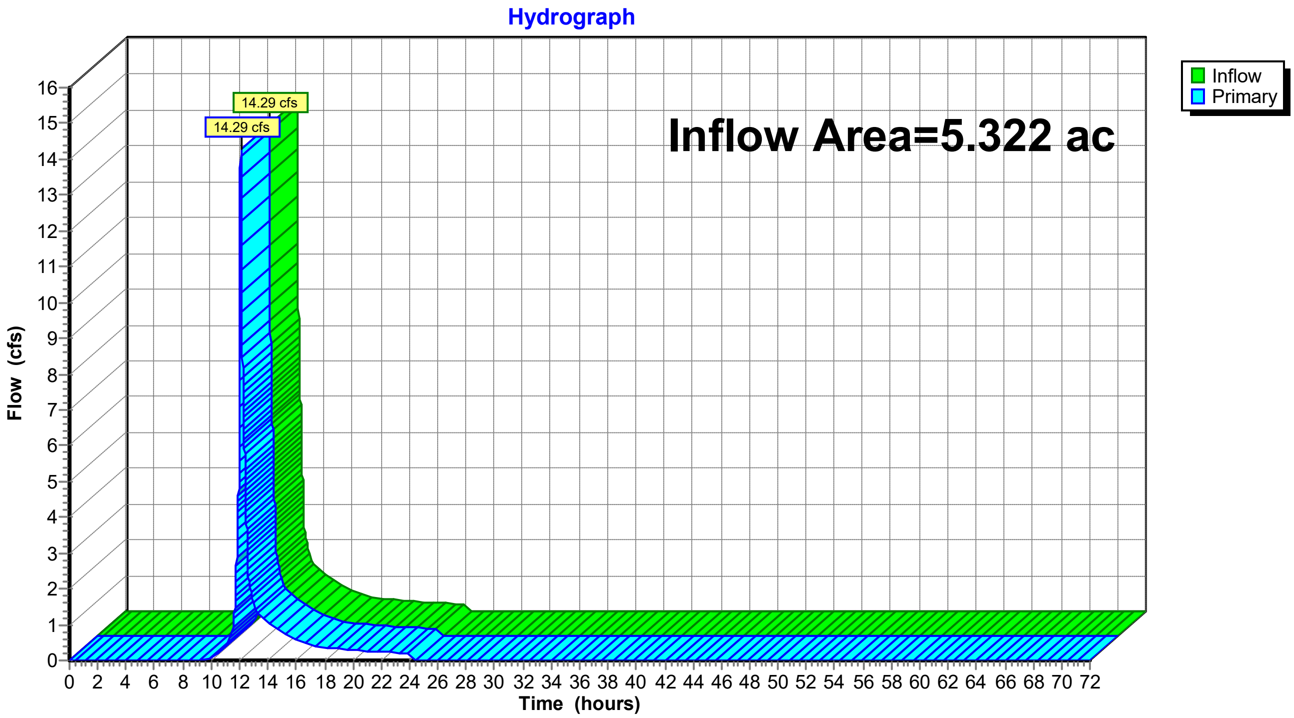


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area = 5.322 ac, 41.12% Impervious, Inflow Depth = 2.32" for 25-Year event
Inflow = 14.29 cfs @ 12.09 hrs, Volume= 1.027 af
Primary = 14.29 cfs @ 12.09 hrs, Volume= 1.027 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

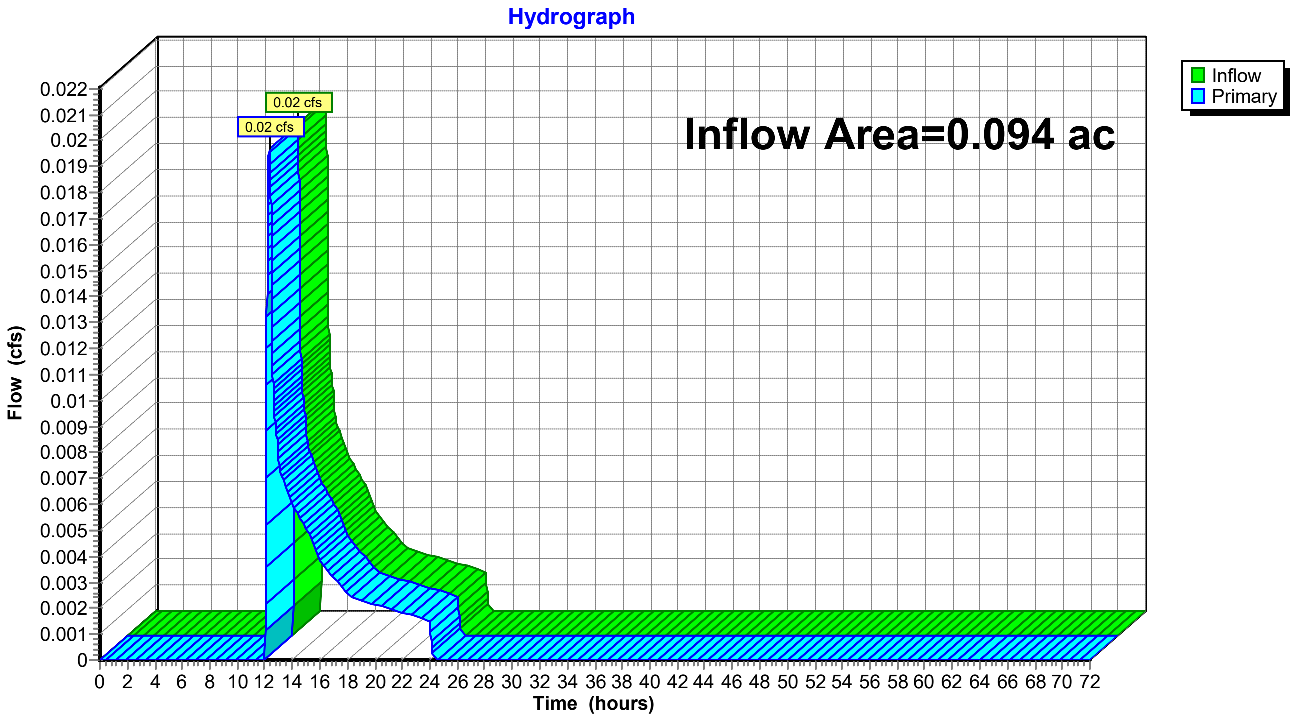


Summary for Link DP-2: Ditch

Inflow Area =	0.094 ac,	0.00% Impervious, Inflow Depth = 0.50"	for 25-Year event	
Inflow =	0.02 cfs @	12.33 hrs, Volume=	0.004 af	
Primary =	0.02 cfs @	12.33 hrs, Volume=	0.004 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A: Subcatchment 1 Runoff Area=201,945 sf 36.57% Impervious Runoff Depth=4.84"
Tc=6.0 min CN=67 Runoff=26.30 cfs 1.868 af

Subcatchment 1B: Area Draining to Runoff Area=29,873 sf 71.84% Impervious Runoff Depth=6.55"
Tc=6.0 min CN=81 Runoff=5.13 cfs 0.374 af

Subcatchment 2: Subcatchment 2 Runoff Area=4,115 sf 0.00% Impervious Runoff Depth=1.53"
Tc=6.0 min CN=39 Runoff=0.13 cfs 0.012 af

Pond P1: Porous Pavement Peak Elev=161.81' Storage=3,521 cf Inflow=5.13 cfs 0.374 af
Discarded=1.19 cfs 0.374 af Primary=0.00 cfs 0.000 af Outflow=1.19 cfs 0.374 af

Link DP-1: Reservoir and Swimming Area Inflow=26.30 cfs 1.868 af
Primary=26.30 cfs 1.868 af

Link DP-2: Ditch Inflow=0.13 cfs 0.012 af
Primary=0.13 cfs 0.012 af

Total Runoff Area = 5.416 ac Runoff Volume = 2.255 af Average Runoff Depth = 5.00"
59.60% Pervious = 3.228 ac 40.40% Impervious = 2.188 ac

Summary for Subcatchment 1A: Subcatchment 1 Minus Parking Lot

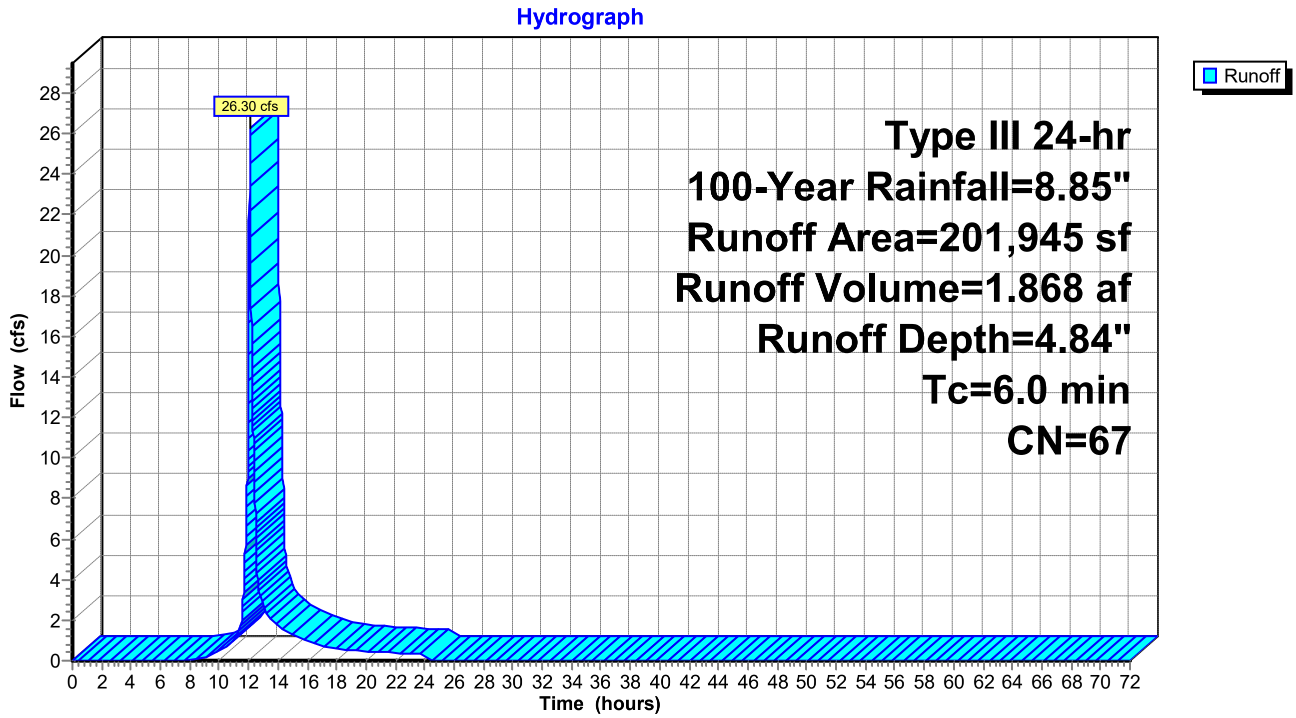
Runoff = 26.30 cfs @ 12.09 hrs, Volume= 1.868 af, Depth= 4.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.85"

	Area (sf)	CN	Description
	13,237	30	Brush, Good, HSG A
*	44,830	63	Beach Sand, HSG A
	56,001	39	>75% Grass cover, Good, HSG A
	19,764	98	Impervious Surface, HSG A
*	1,800	98	Porous Pavement, HSG A
	52,292	98	Water Surface, HSG A
*	6,010	96	Stone Dust, HSG A
*	8,011	39	Permeable Playground Surface, Good, HSG A
	201,945	67	Weighted Average
	128,089		63.43% Pervious Area
	73,856		36.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1A: Subcatchment 1 Minus Parking Lot



Summary for Subcatchment 1B: Area Draining to Parking Lot

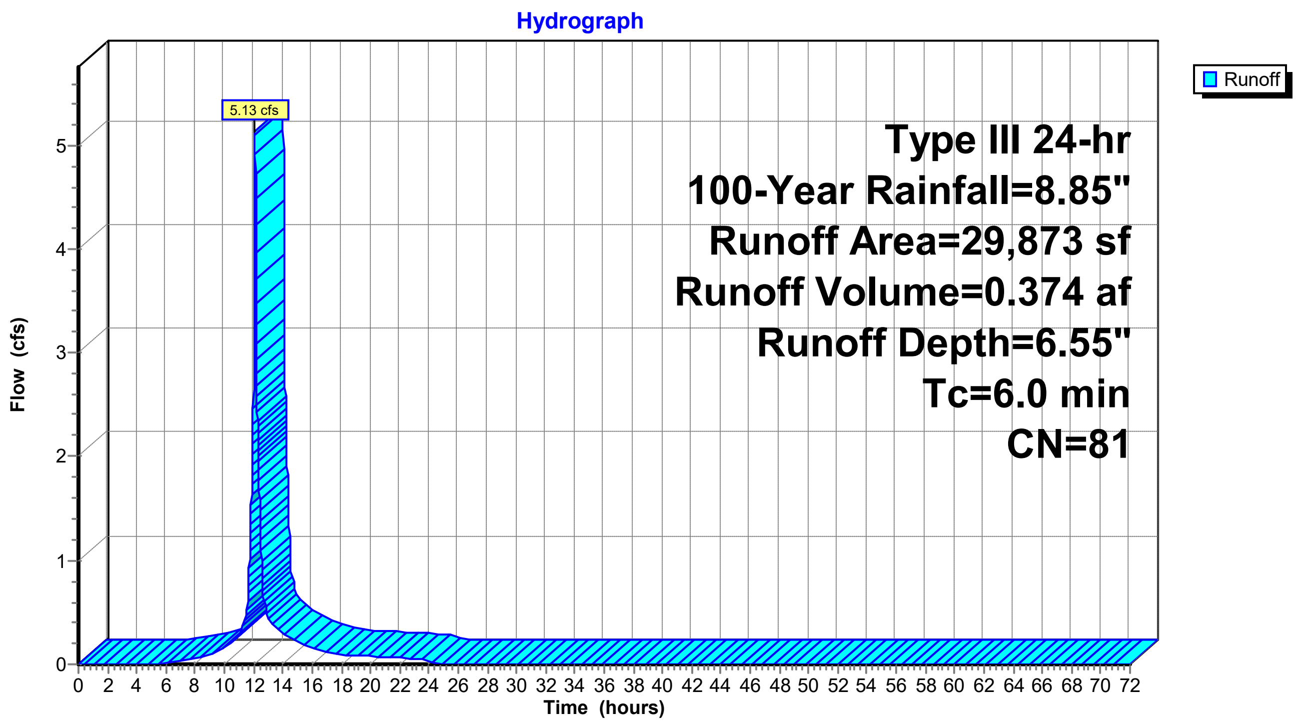
Runoff = 5.13 cfs @ 12.09 hrs, Volume= 0.374 af, Depth= 6.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.85"

	Area (sf)	CN	Description
	8,411	39	>75% Grass cover, Good, HSG A
	574	98	Impervious Surface, HSG A
*	20,888	98	Porous Pavement, HSG A
	29,873	81	Weighted Average
	8,411		28.16% Pervious Area
	21,462		71.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1B: Area Draining to Parking Lot



Summary for Subcatchment 2: Subcatchment 2

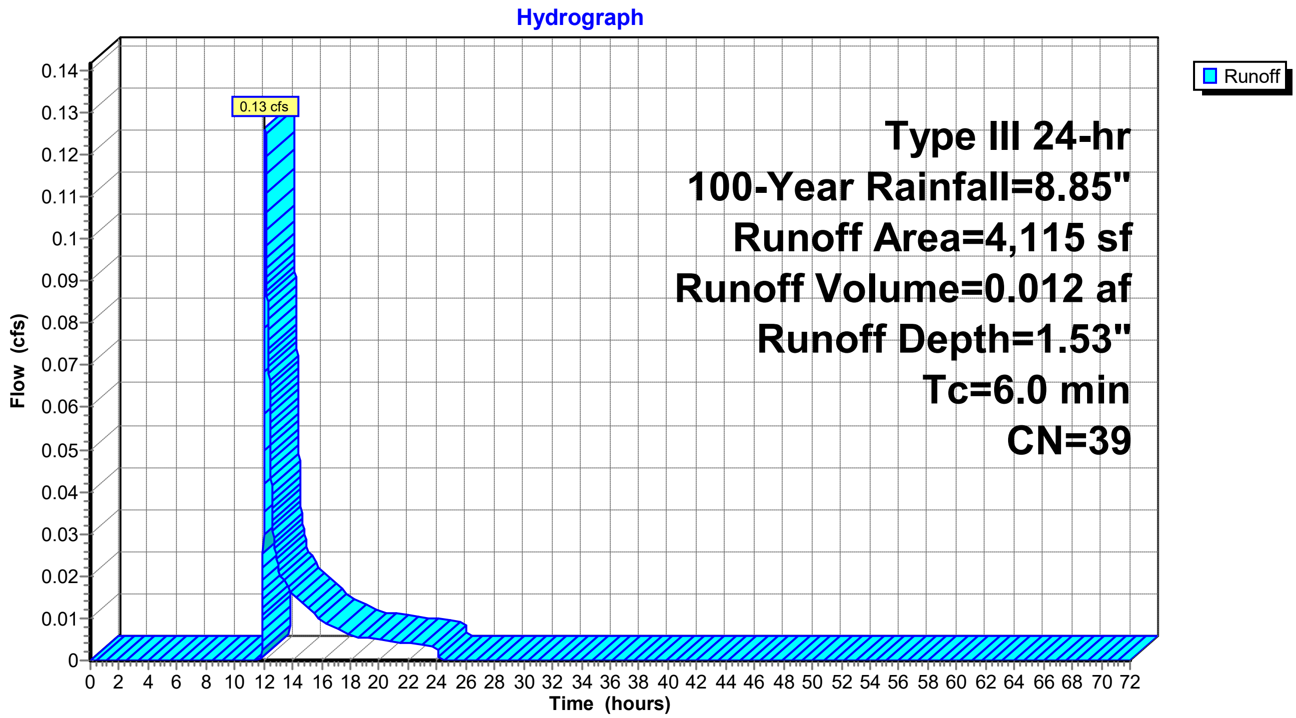
Runoff = 0.13 cfs @ 12.11 hrs, Volume= 0.012 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.85"

Area (sf)	CN	Description
4,115	39	>75% Grass cover, Good, HSG A
4,115		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2



Summary for Pond P1: Porous Pavement

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=514)

Inflow Area =	0.686 ac, 71.84% Impervious,	Inflow Depth = 6.55"	for 100-Year event	
Inflow =	5.13 cfs @	12.09 hrs, Volume=	0.374 af	
Outflow =	1.19 cfs @	11.92 hrs, Volume=	0.374 af,	Atten= 77%, Lag= 0.0 min
Discarded =	1.19 cfs @	11.92 hrs, Volume=	0.374 af	
Primary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 161.81' @ 12.48 hrs Surf.Area= 21,411 sf Storage= 3,521 cf
Flood Elev= 164.00' Surf.Area= 42,822 sf Storage= 11,383 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 14.9 min (811.7 - 796.9)

Volume	Invert	Avail.Storage	Storage Description
#1	161.40'	7,099 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 17,771 cf Overall - 23 cf Embedded = 17,749 cf x 40.0% Voids
#2	162.23'	4,261 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#3	161.73'	23 cf	**4.0" Round Pipe Storage** Inside #1 L= 258.0'
		11,383 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
161.40	21,411	0	0
162.23	21,411	17,771	17,771

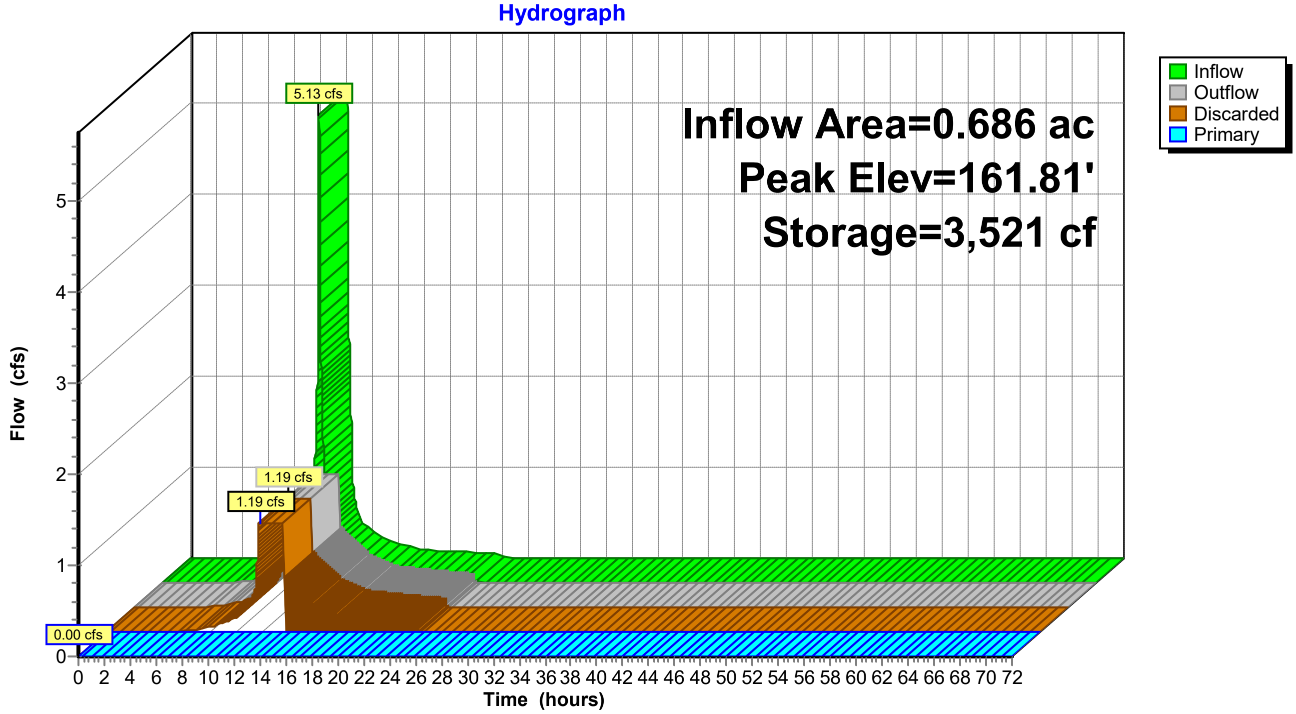
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
162.23	21,411	0.0	0	0
162.48	21,411	40.0	2,141	2,141
162.81	21,411	30.0	2,120	4,261

Device	Routing	Invert	Outlet Devices
#1	Primary	162.15'	**12.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 162.15' / 162.05' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	161.73'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	161.40'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.19 cfs @ 11.92 hrs HW=161.43' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.40' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond P1: Porous Pavement

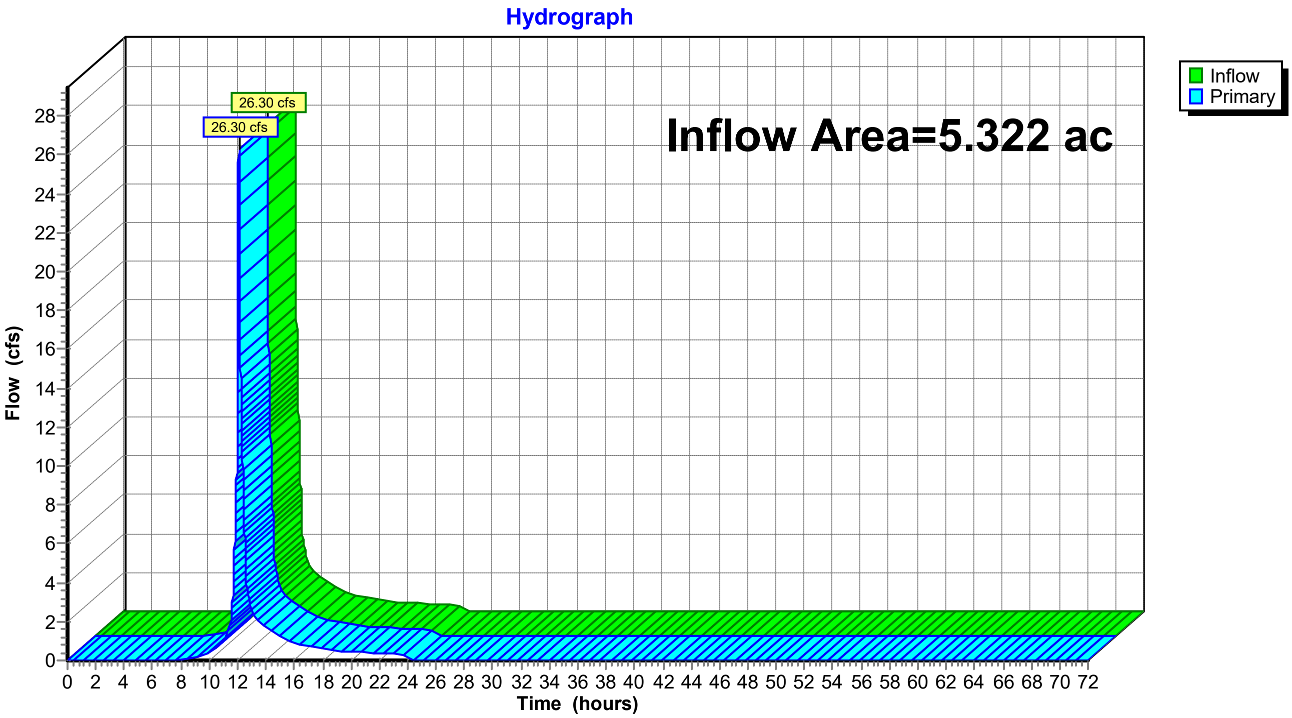


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area = 5.322 ac, 41.12% Impervious, Inflow Depth = 4.21" for 100-Year event
Inflow = 26.30 cfs @ 12.09 hrs, Volume= 1.868 af
Primary = 26.30 cfs @ 12.09 hrs, Volume= 1.868 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

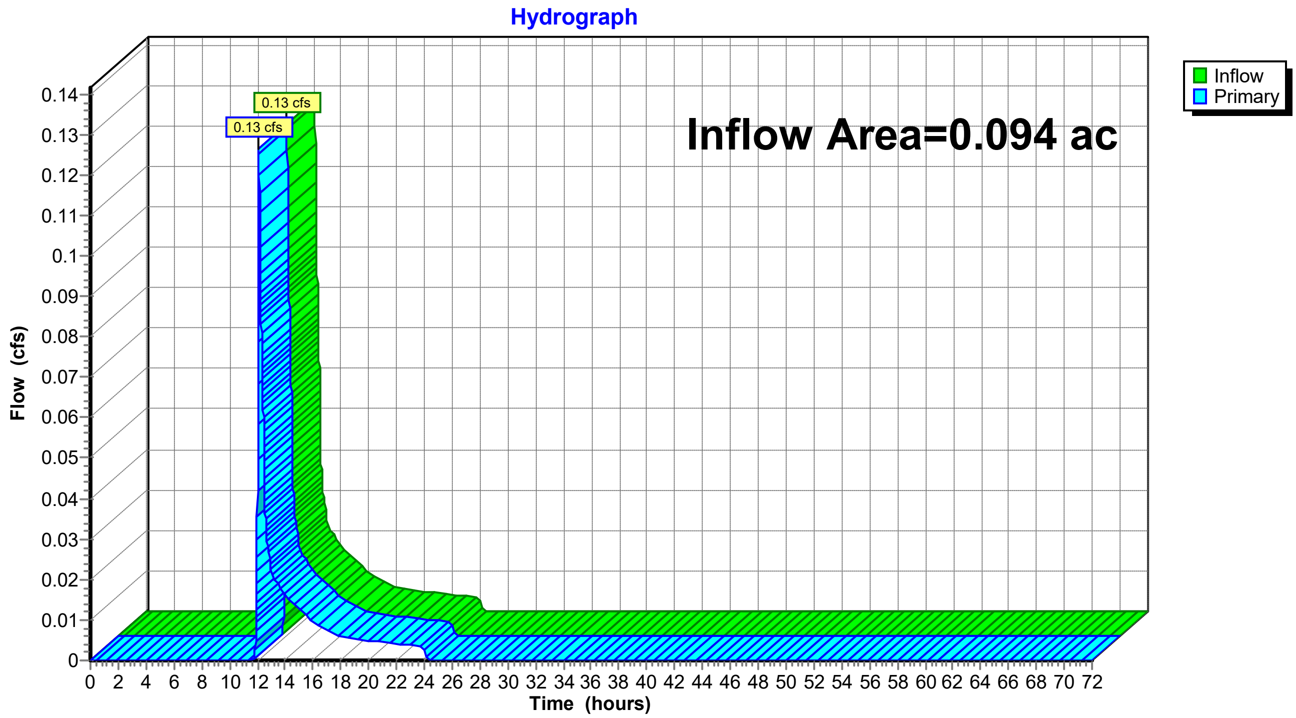


Summary for Link DP-2: Ditch

Inflow Area =	0.094 ac,	0.00% Impervious,	Inflow Depth = 1.53"	for 100-Year event	
Inflow =	0.13 cfs @	12.11 hrs,	Volume=	0.012 af	
Primary =	0.13 cfs @	12.11 hrs,	Volume=	0.012 af,	Atten= 0%, Lag= 0.0 min

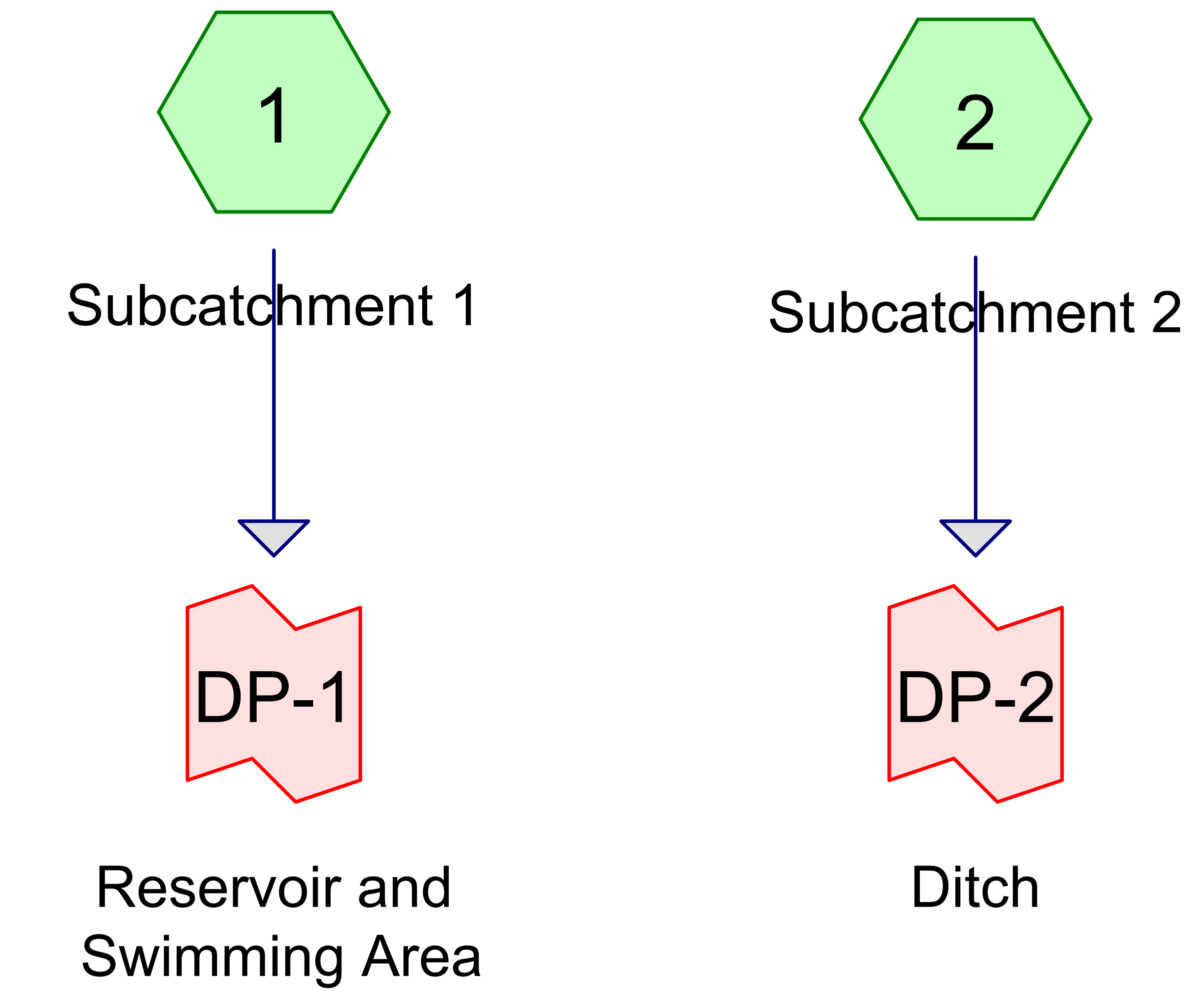
Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

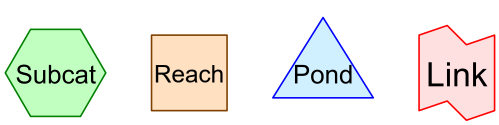
Link DP-2: Ditch



APPENDIX D CONTINUED:

HYDROCAD STORMWATER MODEL REPORTS FOR ATLAS 14 PLUS ANALYSIS





Routing Diagram for 2020.10.06 Existing - Arlington Res Atlas Plus
Prepared by Woodard Curran, Printed 12/30/2020
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.531	49	50-75% Grass cover, Fair, HSG A (1, 2)
1.317	63	Beach Sand, HSG A (1)
0.379	30	Brush, Good, HSG A (1, 2)
0.046	96	Dense Sand Path, HSG A (1)
0.646	98	Gravel parking, HSG A (1, 2)
0.234	98	Impervious Surface, HSG A (1, 2)
0.055	39	Open Space, Good, HSG A (>75% Grass Cover) (1)
1.207	98	Water Surface, HSG A (1)
5.416	**70**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
5.416	HSG A	1, 2
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
5.416		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
1.531	0.000	0.000	0.000	0.000	1.531	50-75% Grass cover, Fair	1, 2
1.317	0.000	0.000	0.000	0.000	1.317	Beach Sand	1
0.379	0.000	0.000	0.000	0.000	0.379	Brush, Good	1, 2
0.046	0.000	0.000	0.000	0.000	0.046	Dense Sand Path	1
0.646	0.000	0.000	0.000	0.000	0.646	Gravel parking	1, 2
0.234	0.000	0.000	0.000	0.000	0.234	Impervious Surface	1, 2
0.055	0.000	0.000	0.000	0.000	0.055	Open Space, Good	1
1.207	0.000	0.000	0.000	0.000	1.207	Water Surface	1
5.416	**0.000**	**0.000**	**0.000**	**0.000**	**5.416**	**TOTAL AREA**	

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Subcatchment1 Runoff Area=227,252 sf 38.51% Impervious Runoff Depth=0.72"
Tc=6.0 min CN=71 Runoff=3.86 cfs 0.313 af

Subcatchment2: Subcatchment2 Runoff Area=8,681 sf 39.47% Impervious Runoff Depth=0.44"
Tc=6.0 min CN=64 Runoff=0.07 cfs 0.007 af

Link DP-1: Reservoir and Swimming Area Inflow=3.86 cfs 0.313 af
Primary=3.86 cfs 0.313 af

Link DP-2: Ditch Inflow=0.07 cfs 0.007 af
Primary=0.07 cfs 0.007 af

Total Runoff Area = 5.416 ac Runoff Volume = 0.321 af Average Runoff Depth = 0.71"
61.46% Pervious = 3.329 ac 38.54% Impervious = 2.088 ac

Summary for Subcatchment 1: Subcatchment 1

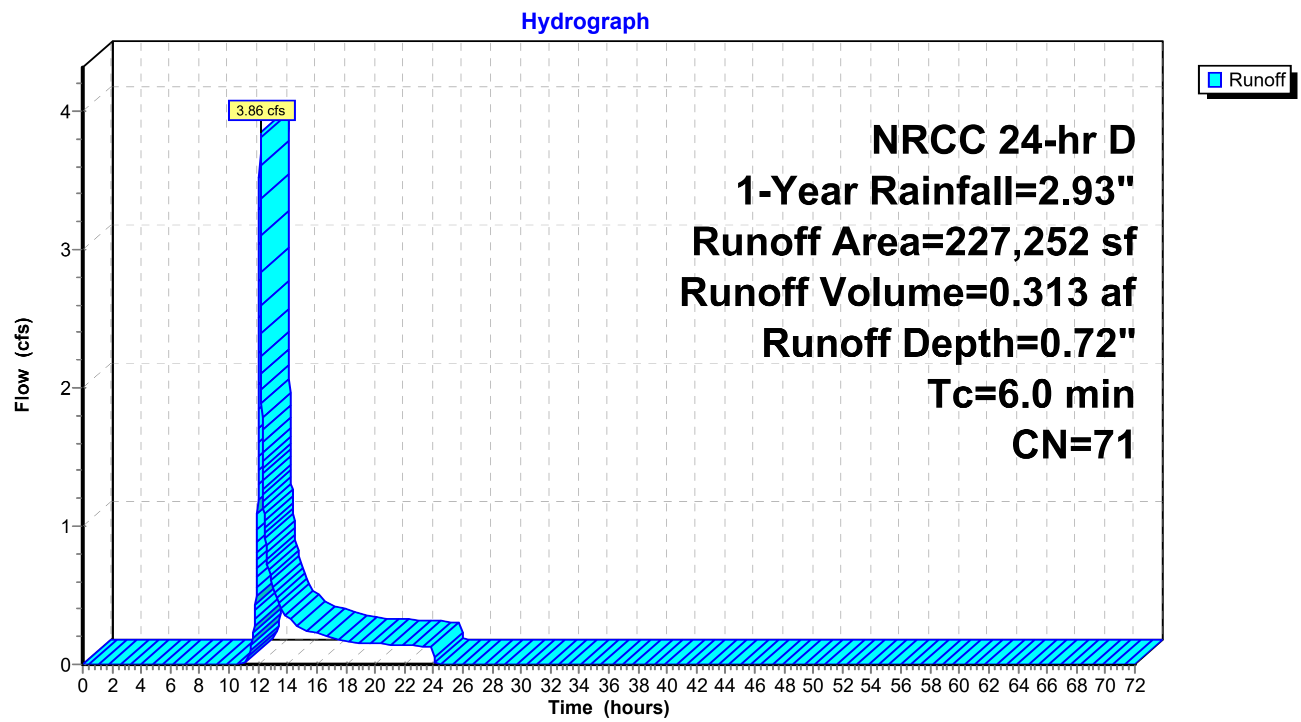
Runoff = 3.86 cfs @ 12.14 hrs, Volume= 0.313 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 1-Year Rainfall=2.93"

	Area (sf)	CN	Description
	14,435	30	Brush, Good, HSG A
*	57,370	63	Beach Sand, HSG A
*	1,998	96	Dense Sand Path, HSG A
	63,530	49	50-75% Grass cover, Fair, HSG A
*	24,927	98	Gravel parking, HSG A
*	9,994	98	Impervious Surface, HSG A
	52,585	98	Water Surface, HSG A
*	2,413	39	Open Space, Good, HSG A (>75% Grass Cover)
	227,252	71	Weighted Average
	139,746		61.49% Pervious Area
	87,506		38.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1: Subcatchment 1



Summary for Subcatchment 2: Subcatchment 2

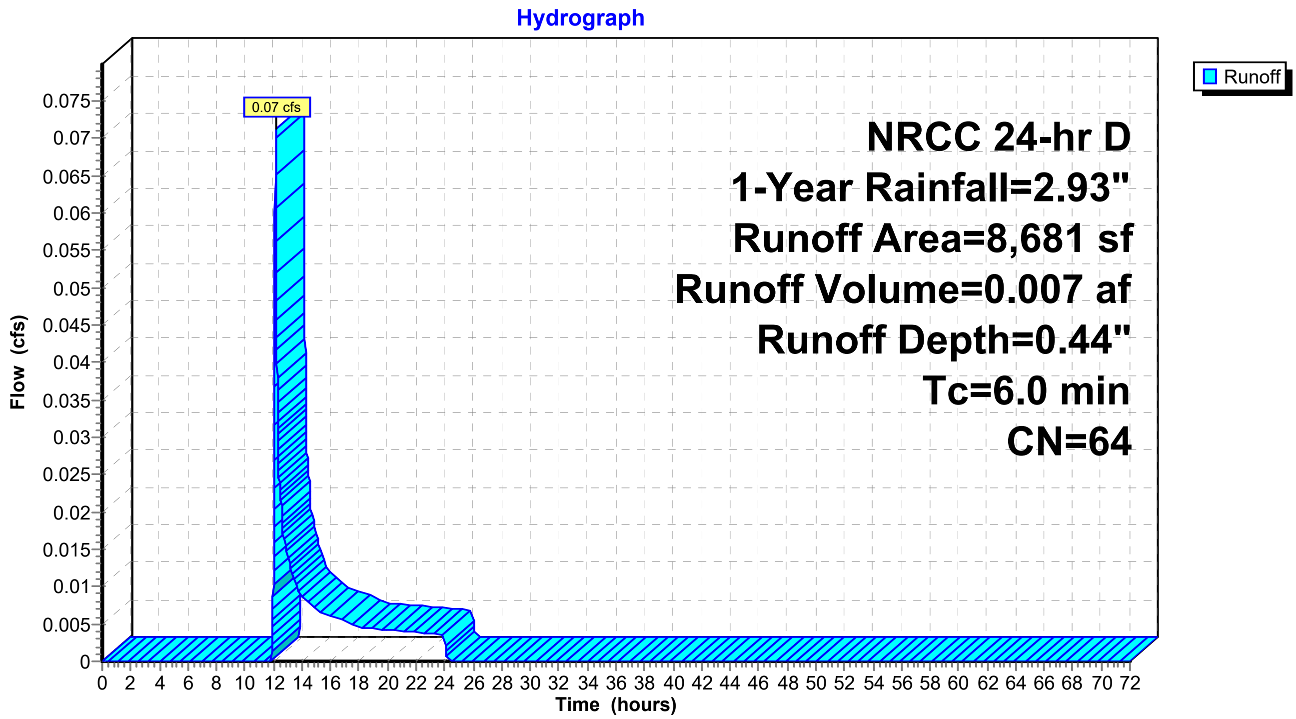
Runoff = 0.07 cfs @ 12.14 hrs, Volume= 0.007 af, Depth= 0.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 1-Year Rainfall=2.93"

	Area (sf)	CN	Description
	2,076	30	Brush, Good, HSG A
	3,179	49	50-75% Grass cover, Fair, HSG A
*	3,211	98	Gravel parking, HSG A
	215	98	Impervious Surface, HSG A
	8,681	64	Weighted Average
	5,255		60.53% Pervious Area
	3,426		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2

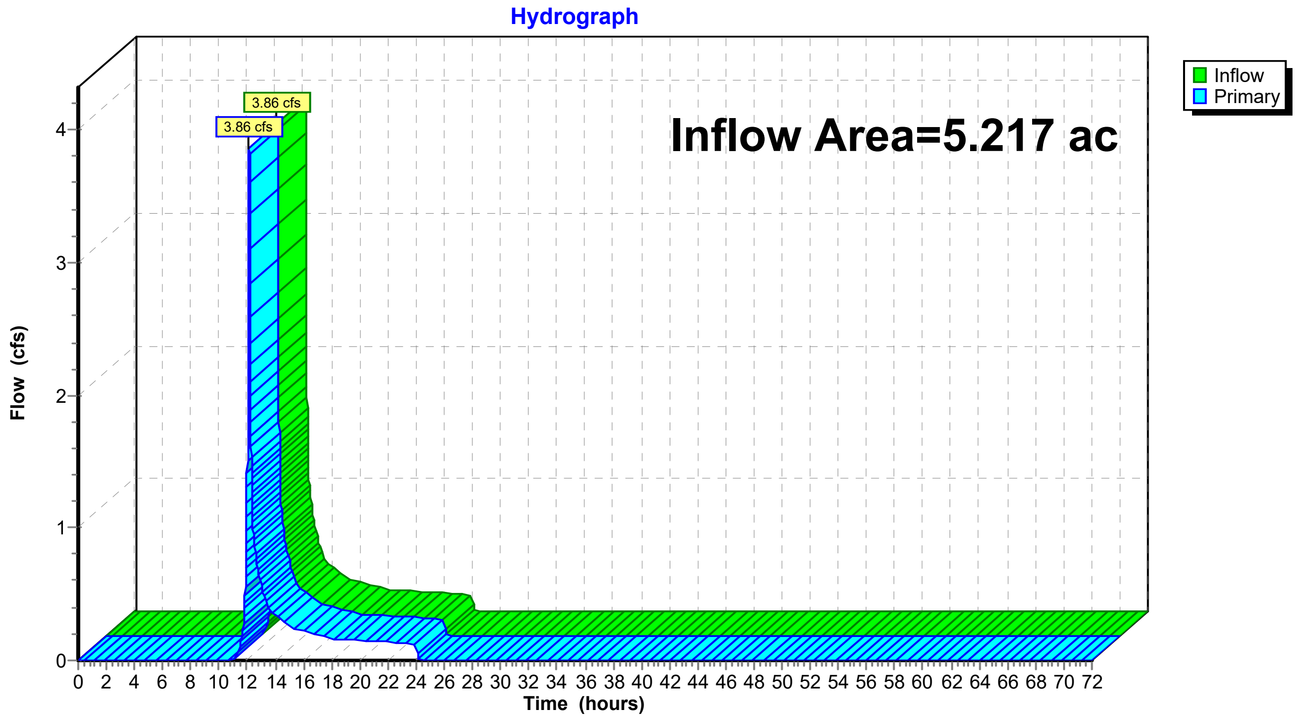


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.217 ac,	38.51% Impervious,	Inflow Depth = 0.72"	for 1-Year event
Inflow =	3.86 cfs @	12.14 hrs, Volume=	0.313 af	
Primary =	3.86 cfs @	12.14 hrs, Volume=	0.313 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

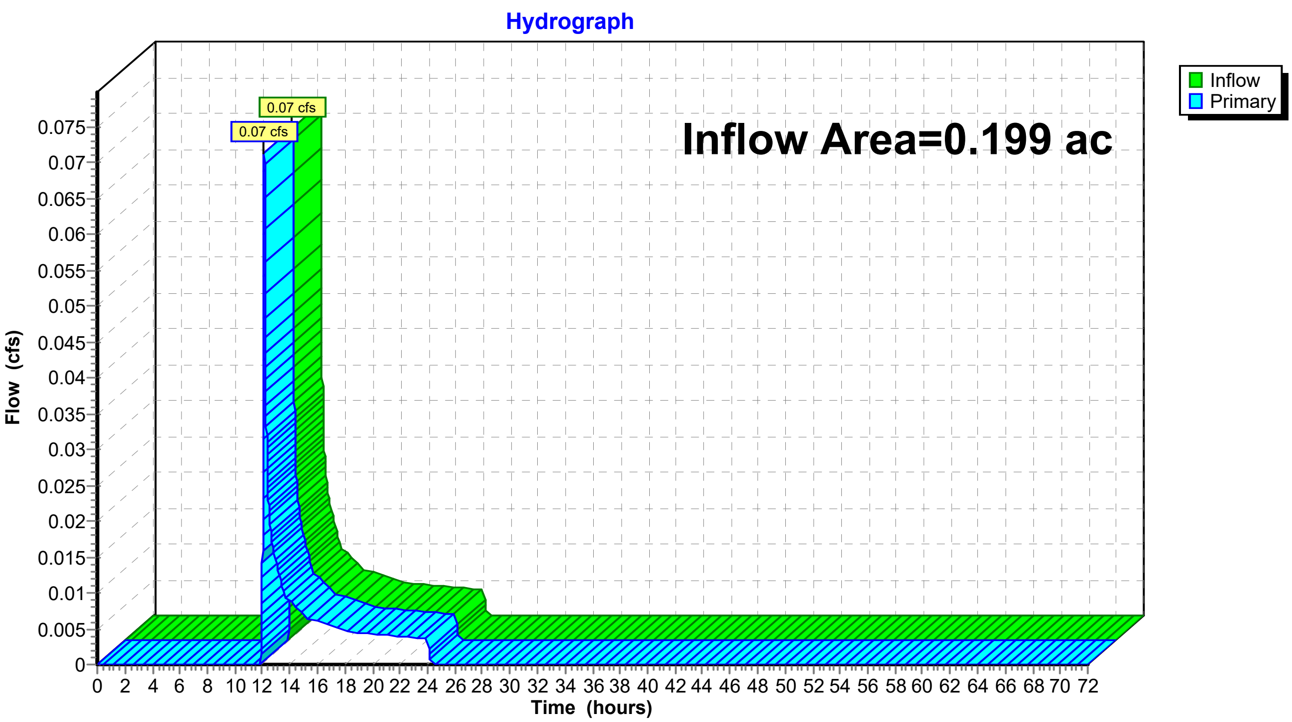


Summary for Link DP-2: Ditch

Inflow Area = 0.199 ac, 39.47% Impervious, Inflow Depth = 0.44" for 1-Year event
Inflow = 0.07 cfs @ 12.14 hrs, Volume= 0.007 af
Primary = 0.07 cfs @ 12.14 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Subcatchment1 Runoff Area=227,252 sf 38.51% Impervious Runoff Depth=1.15"
Tc=6.0 min CN=71 Runoff=6.51 cfs 0.502 af

Subcatchment2: Subcatchment2 Runoff Area=8,681 sf 39.47% Impervious Runoff Depth=0.78"
Tc=6.0 min CN=64 Runoff=0.15 cfs 0.013 af

Link DP-1: Reservoir and Swimming Area Inflow=6.51 cfs 0.502 af
Primary=6.51 cfs 0.502 af

Link DP-2: Ditch Inflow=0.15 cfs 0.013 af
Primary=0.15 cfs 0.013 af

Total Runoff Area = 5.416 ac Runoff Volume = 0.515 af Average Runoff Depth = 1.14"
61.46% Pervious = 3.329 ac 38.54% Impervious = 2.088 ac

Summary for Subcatchment 1: Subcatchment 1

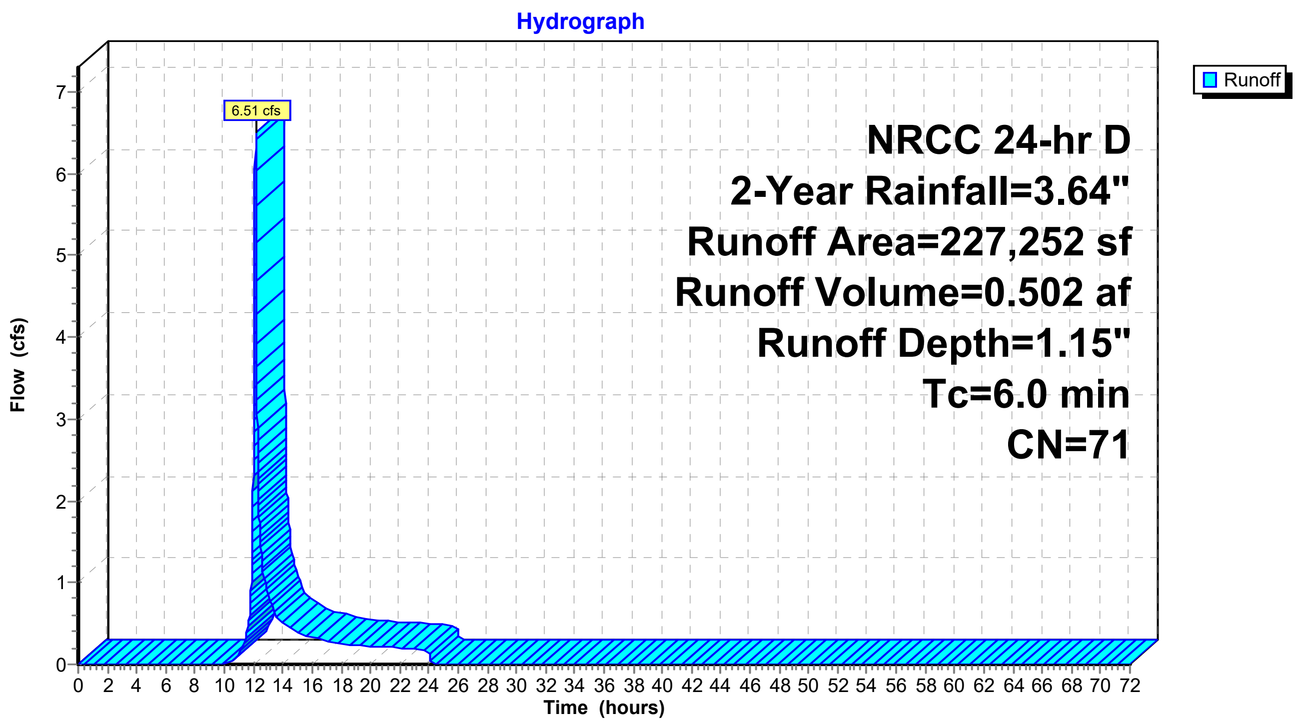
Runoff = 6.51 cfs @ 12.14 hrs, Volume= 0.502 af, Depth= 1.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-Year Rainfall=3.64"

	Area (sf)	CN	Description
	14,435	30	Brush, Good, HSG A
*	57,370	63	Beach Sand, HSG A
*	1,998	96	Dense Sand Path, HSG A
	63,530	49	50-75% Grass cover, Fair, HSG A
*	24,927	98	Gravel parking, HSG A
*	9,994	98	Impervious Surface, HSG A
	52,585	98	Water Surface, HSG A
*	2,413	39	Open Space, Good, HSG A (>75% Grass Cover)
	227,252	71	Weighted Average
	139,746		61.49% Pervious Area
	87,506		38.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1: Subcatchment 1



Summary for Subcatchment 2: Subcatchment 2

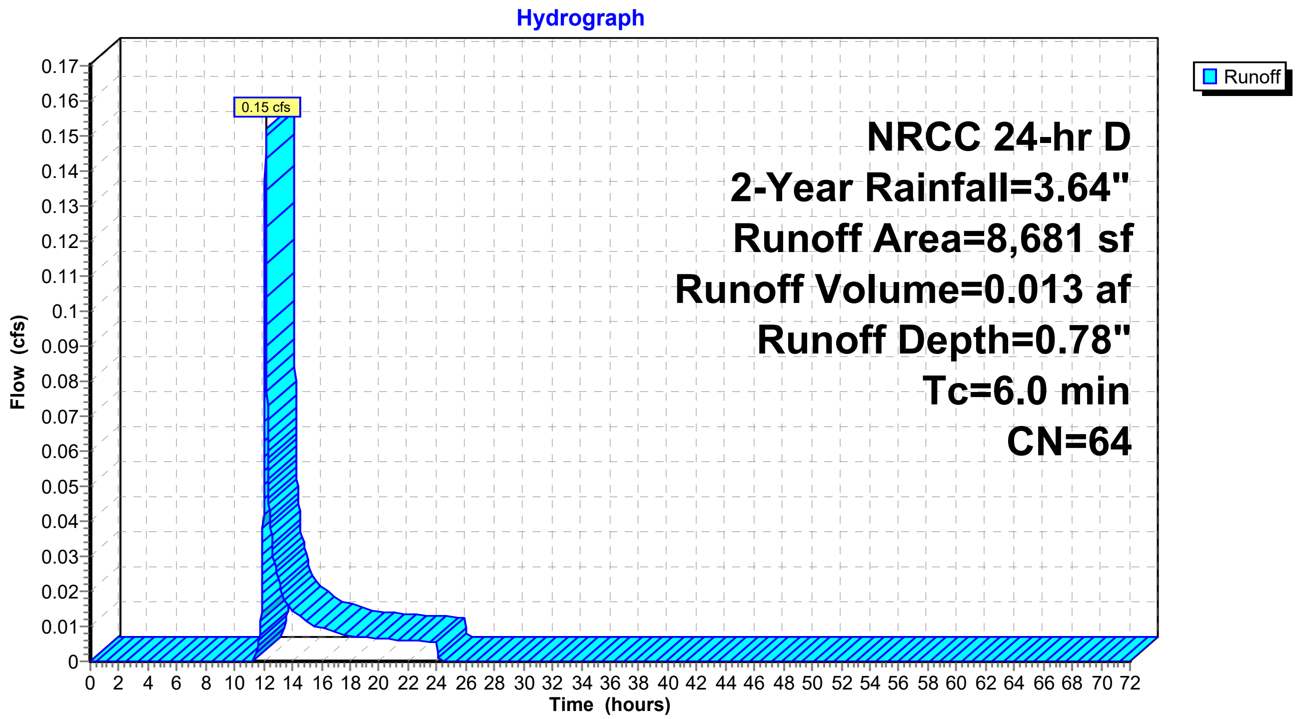
Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.013 af, Depth= 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-Year Rainfall=3.64"

	Area (sf)	CN	Description
	2,076	30	Brush, Good, HSG A
	3,179	49	50-75% Grass cover, Fair, HSG A
*	3,211	98	Gravel parking, HSG A
	215	98	Impervious Surface, HSG A
	8,681	64	Weighted Average
	5,255		60.53% Pervious Area
	3,426		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2

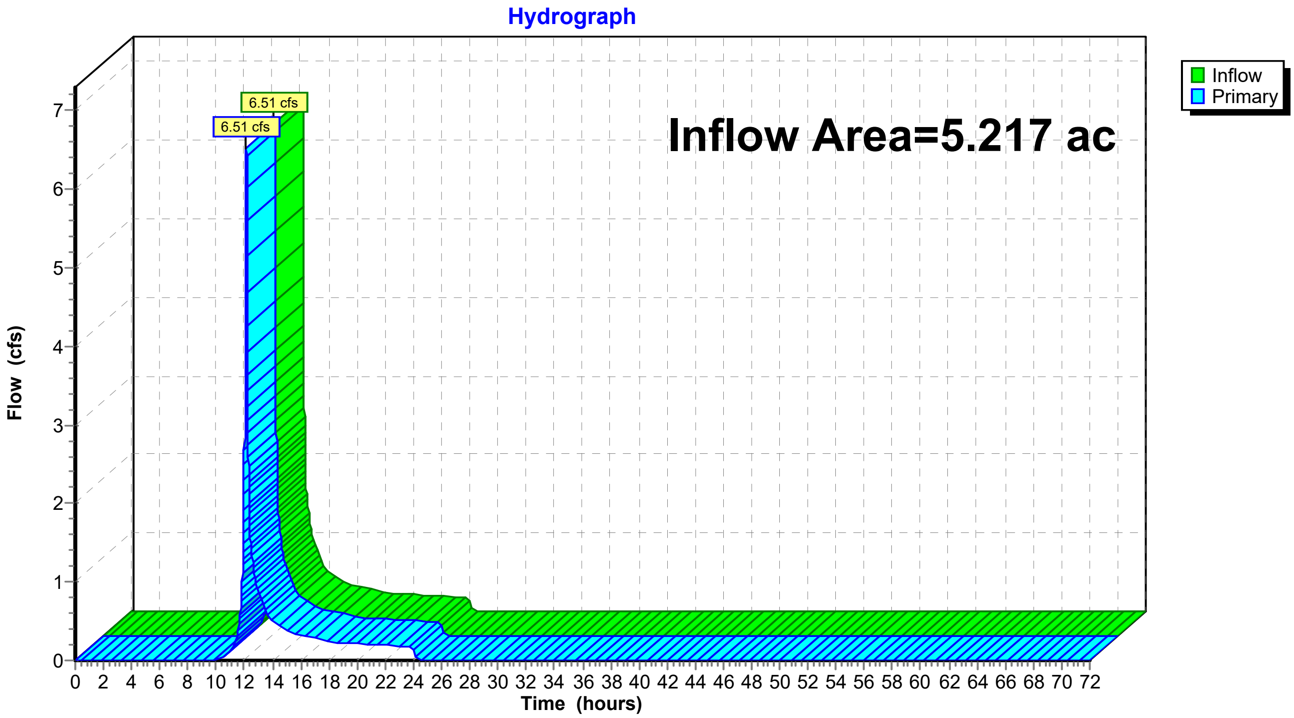


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.217 ac, 38.51% Impervious, Inflow Depth = 1.15"	for 2-Year event	
Inflow =	6.51 cfs @ 12.14 hrs, Volume=	0.502 af	
Primary =	6.51 cfs @ 12.14 hrs, Volume=	0.502 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

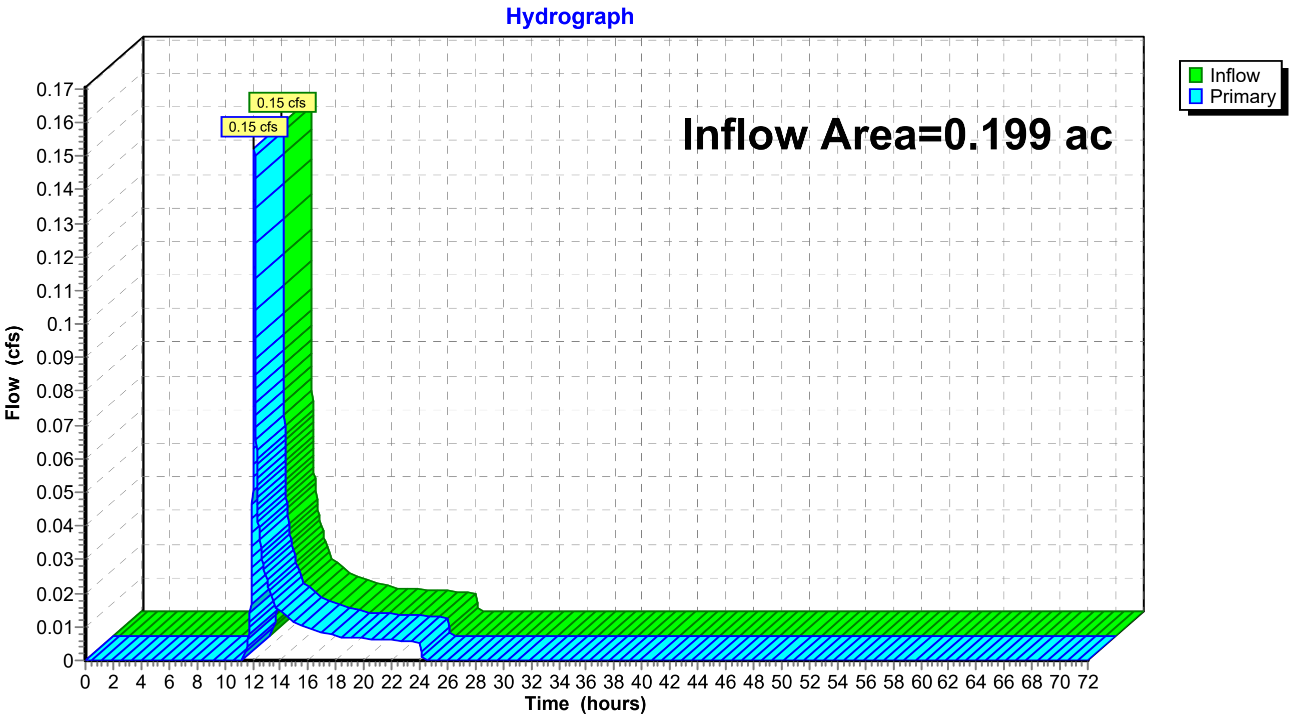


Summary for Link DP-2: Ditch

Inflow Area = 0.199 ac, 39.47% Impervious, Inflow Depth = 0.78" for 2-Year event
Inflow = 0.15 cfs @ 12.14 hrs, Volume= 0.013 af
Primary = 0.15 cfs @ 12.14 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Subcatchment1 Runoff Area=227,252 sf 38.51% Impervious Runoff Depth=2.73"
Tc=6.0 min CN=71 Runoff=15.91 cfs 1.187 af

Subcatchment2: Subcatchment2 Runoff Area=8,681 sf 39.47% Impervious Runoff Depth=2.11"
Tc=6.0 min CN=64 Runoff=0.46 cfs 0.035 af

Link DP-1: Reservoir and Swimming Area Inflow=15.91 cfs 1.187 af
Primary=15.91 cfs 1.187 af

Link DP-2: Ditch Inflow=0.46 cfs 0.035 af
Primary=0.46 cfs 0.035 af

Total Runoff Area = 5.416 ac Runoff Volume = 1.222 af Average Runoff Depth = 2.71"
61.46% Pervious = 3.329 ac 38.54% Impervious = 2.088 ac

Summary for Subcatchment 1: Subcatchment 1

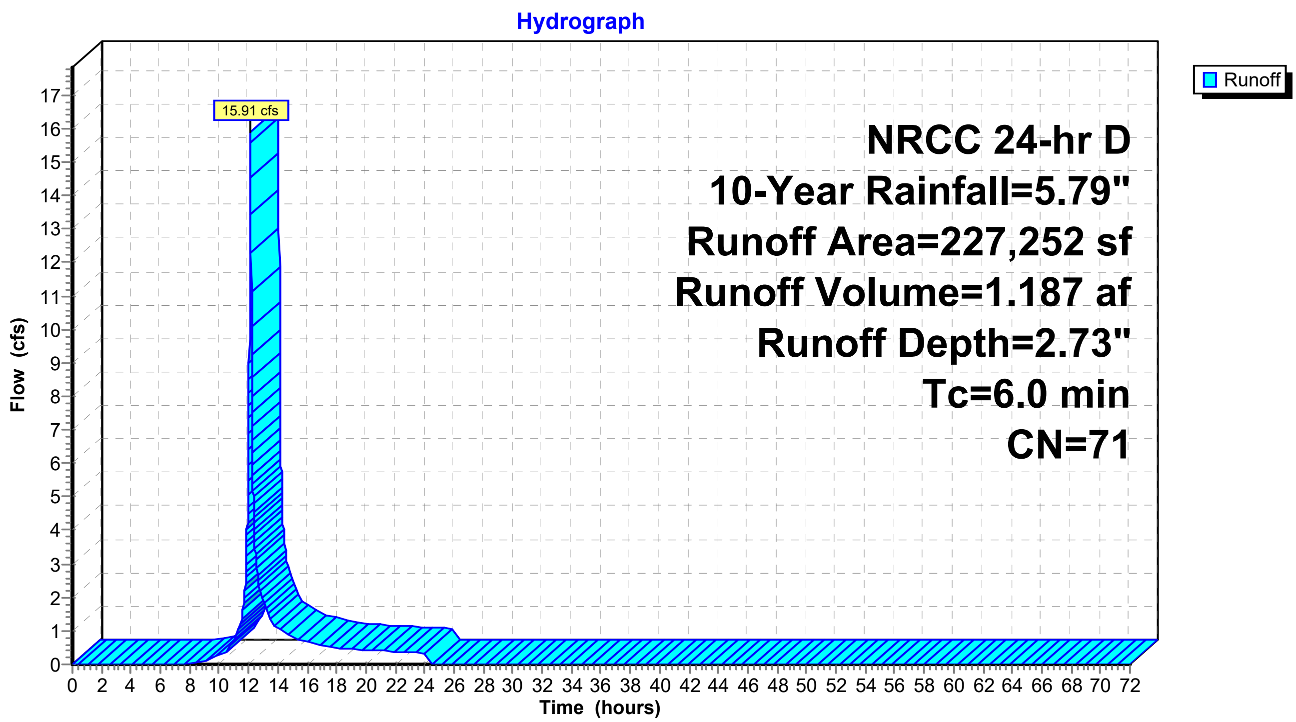
Runoff = 15.91 cfs @ 12.13 hrs, Volume= 1.187 af, Depth= 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-Year Rainfall=5.79"

	Area (sf)	CN	Description
	14,435	30	Brush, Good, HSG A
*	57,370	63	Beach Sand, HSG A
*	1,998	96	Dense Sand Path, HSG A
	63,530	49	50-75% Grass cover, Fair, HSG A
*	24,927	98	Gravel parking, HSG A
*	9,994	98	Impervious Surface, HSG A
	52,585	98	Water Surface, HSG A
*	2,413	39	Open Space, Good, HSG A (>75% Grass Cover)
	227,252	71	Weighted Average
	139,746		61.49% Pervious Area
	87,506		38.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1: Subcatchment 1



Summary for Subcatchment 2: Subcatchment 2

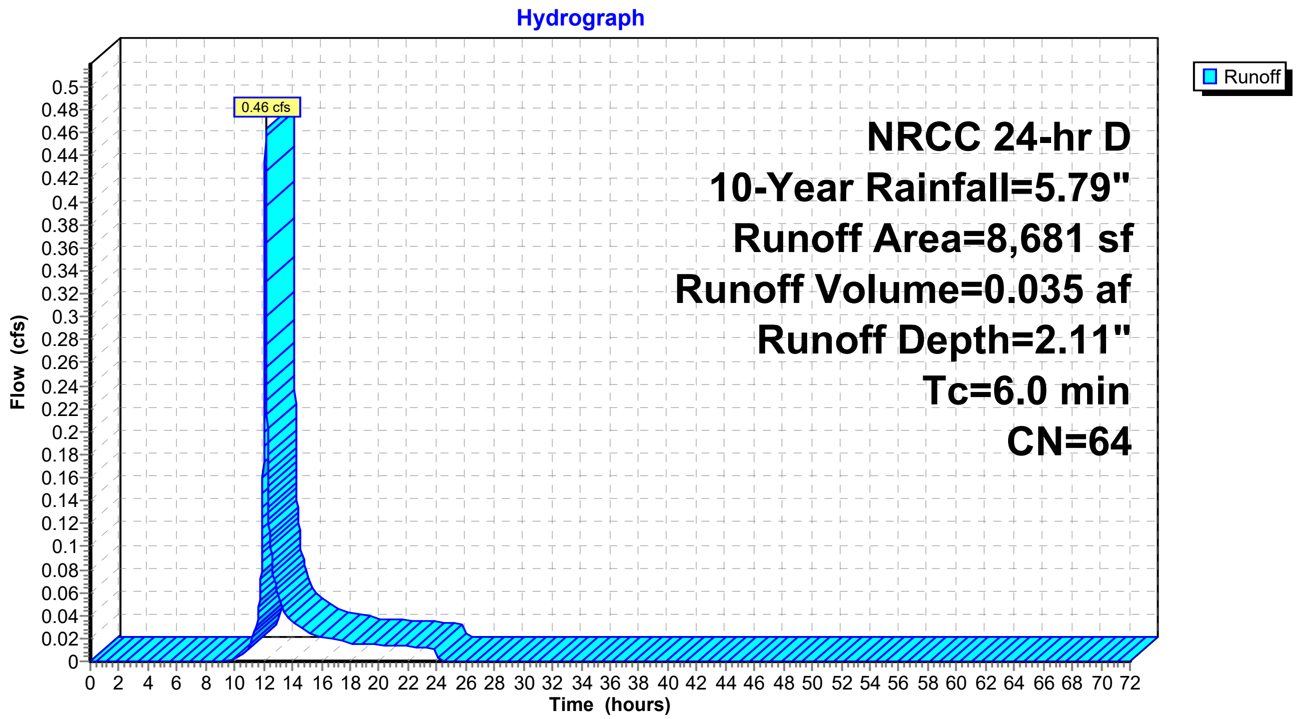
Runoff = 0.46 cfs @ 12.13 hrs, Volume= 0.035 af, Depth= 2.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-Year Rainfall=5.79"

	Area (sf)	CN	Description
	2,076	30	Brush, Good, HSG A
	3,179	49	50-75% Grass cover, Fair, HSG A
*	3,211	98	Gravel parking, HSG A
	215	98	Impervious Surface, HSG A
	8,681	64	Weighted Average
	5,255		60.53% Pervious Area
	3,426		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2

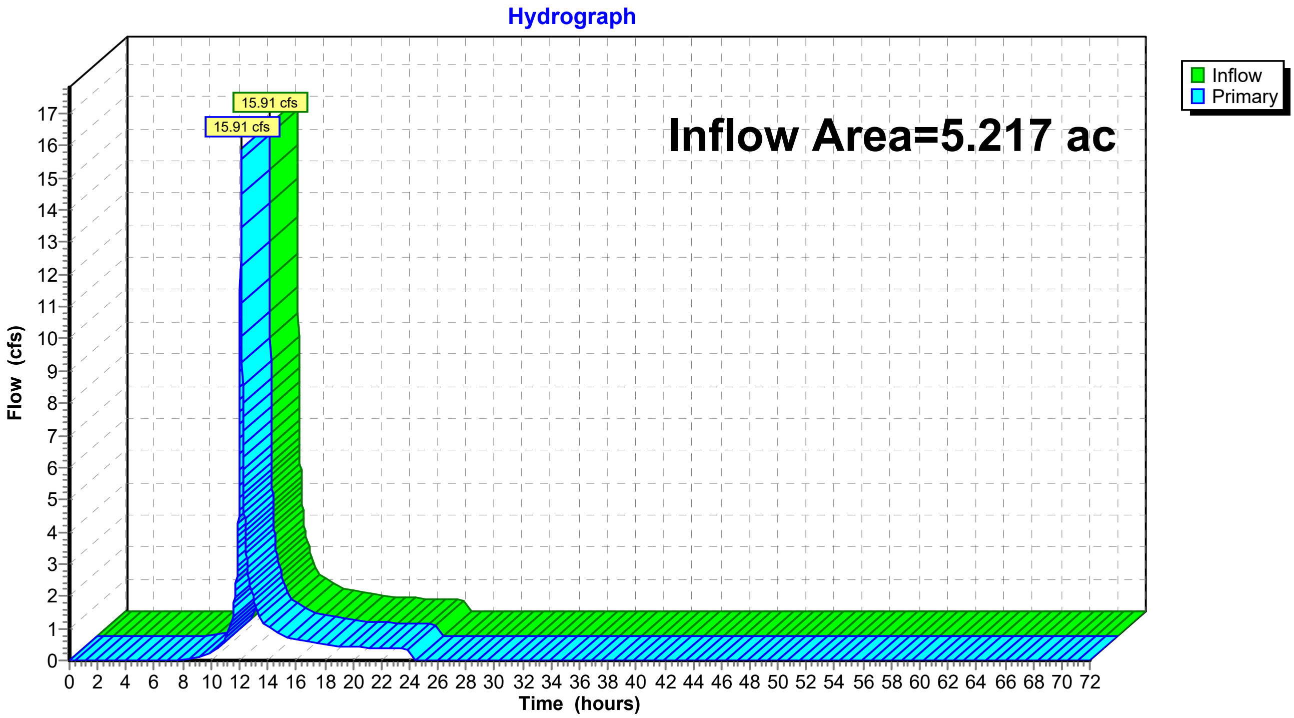


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.217 ac,	38.51% Impervious,	Inflow Depth = 2.73"	for 10-Year event
Inflow =	15.91 cfs @	12.13 hrs, Volume=	1.187 af	
Primary =	15.91 cfs @	12.13 hrs, Volume=	1.187 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

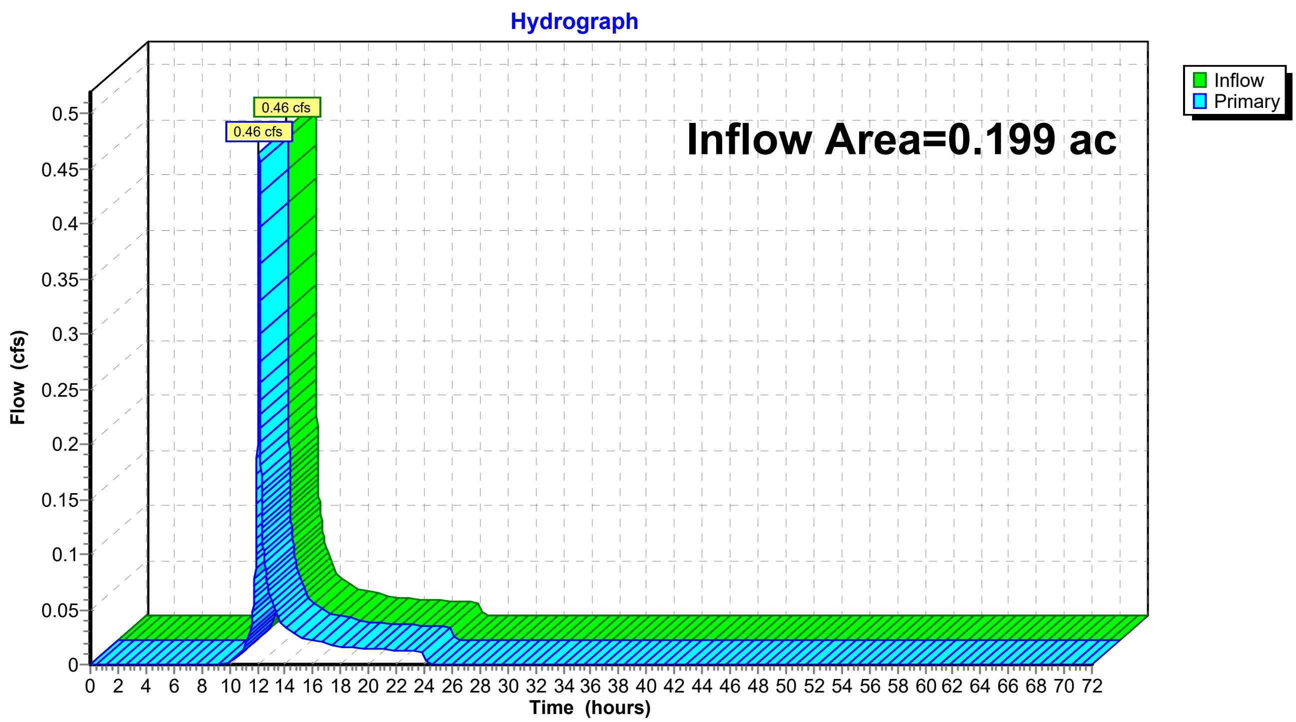


Summary for Link DP-2: Ditch

Inflow Area =	0.199 ac, 39.47% Impervious,	Inflow Depth = 2.11"	for 10-Year event
Inflow =	0.46 cfs @ 12.13 hrs,	Volume=	0.035 af
Primary =	0.46 cfs @ 12.13 hrs,	Volume=	0.035 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Subcatchment1 Runoff Area=227,252 sf 38.51% Impervious Runoff Depth=4.13"
Tc=6.0 min CN=71 Runoff=24.00 cfs 1.796 af

Subcatchment2: Subcatchment2 Runoff Area=8,681 sf 39.47% Impervious Runoff Depth=3.37"
Tc=6.0 min CN=64 Runoff=0.75 cfs 0.056 af

Link DP-1: Reservoir and Swimming Area Inflow=24.00 cfs 1.796 af
Primary=24.00 cfs 1.796 af

Link DP-2: Ditch Inflow=0.75 cfs 0.056 af
Primary=0.75 cfs 0.056 af

Total Runoff Area = 5.416 ac Runoff Volume = 1.852 af Average Runoff Depth = 4.10"
61.46% Pervious = 3.329 ac 38.54% Impervious = 2.088 ac

Summary for Subcatchment 1: Subcatchment 1

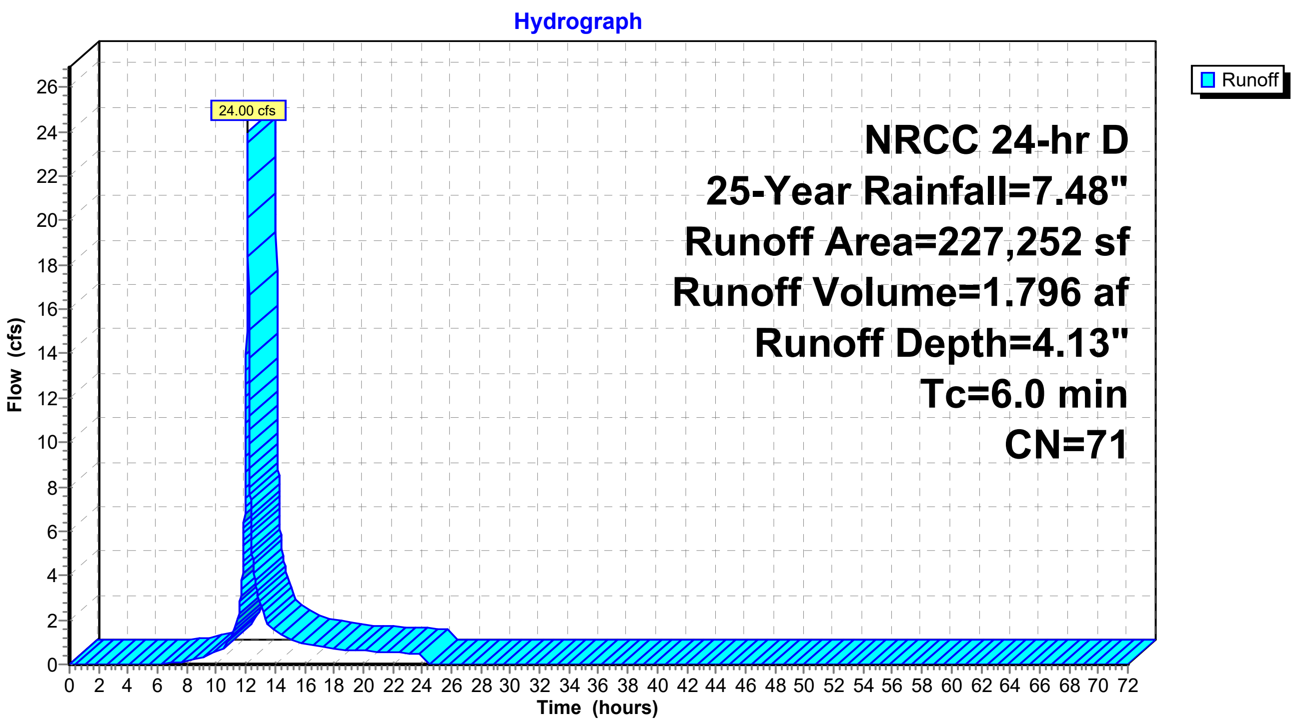
Runoff = 24.00 cfs @ 12.13 hrs, Volume= 1.796 af, Depth= 4.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-Year Rainfall=7.48"

	Area (sf)	CN	Description
	14,435	30	Brush, Good, HSG A
*	57,370	63	Beach Sand, HSG A
*	1,998	96	Dense Sand Path, HSG A
	63,530	49	50-75% Grass cover, Fair, HSG A
*	24,927	98	Gravel parking, HSG A
*	9,994	98	Impervious Surface, HSG A
	52,585	98	Water Surface, HSG A
*	2,413	39	Open Space, Good, HSG A (>75% Grass Cover)
	227,252	71	Weighted Average
	139,746		61.49% Pervious Area
	87,506		38.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1: Subcatchment 1



Summary for Subcatchment 2: Subcatchment 2

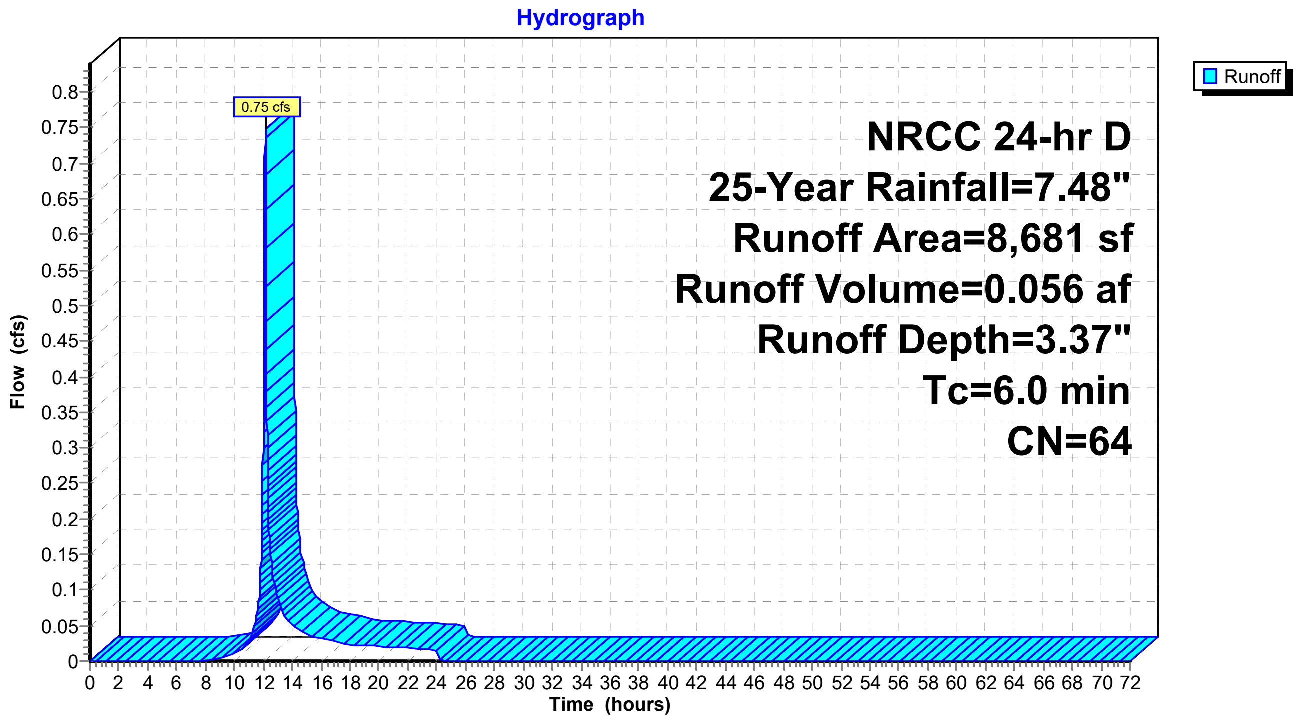
Runoff = 0.75 cfs @ 12.13 hrs, Volume= 0.056 af, Depth= 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-Year Rainfall=7.48"

	Area (sf)	CN	Description
	2,076	30	Brush, Good, HSG A
	3,179	49	50-75% Grass cover, Fair, HSG A
*	3,211	98	Gravel parking, HSG A
	215	98	Impervious Surface, HSG A
	8,681	64	Weighted Average
	5,255		60.53% Pervious Area
	3,426		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2

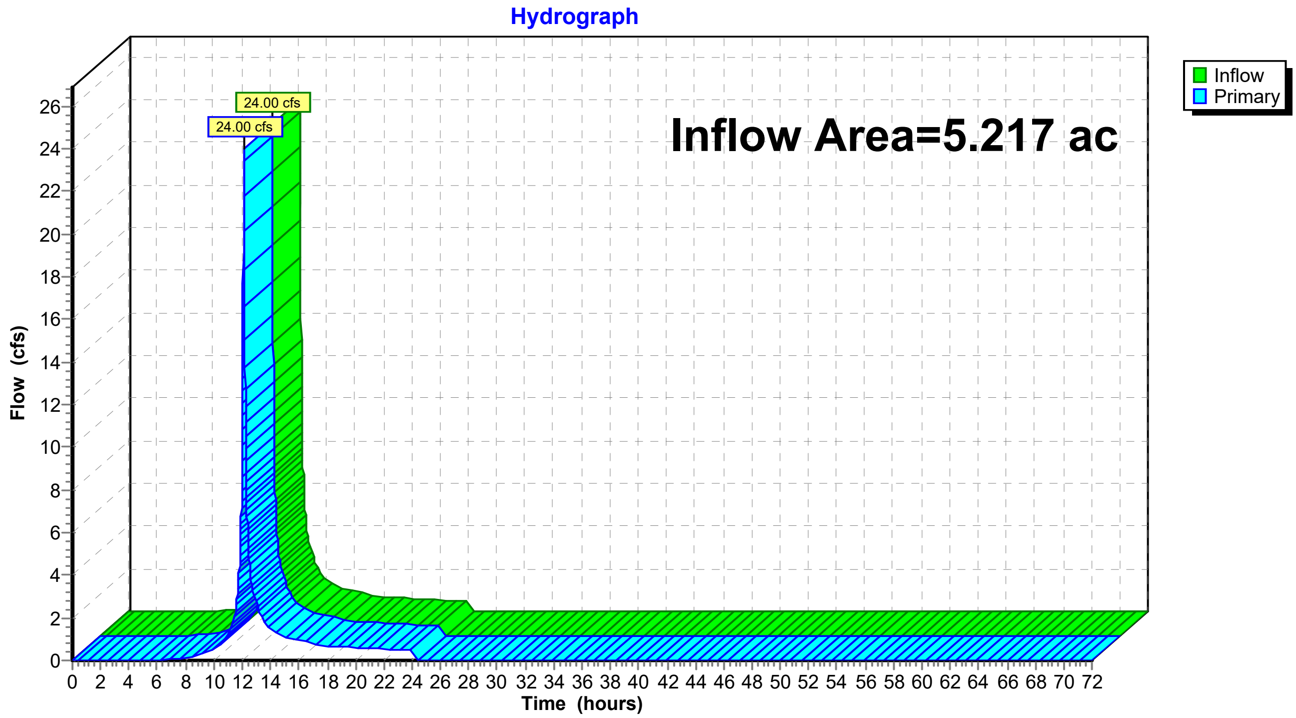


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.217 ac,	38.51% Impervious, Inflow Depth = 4.13"	for 25-Year event	
Inflow =	24.00 cfs @	12.13 hrs, Volume=	1.796 af	
Primary =	24.00 cfs @	12.13 hrs, Volume=	1.796 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

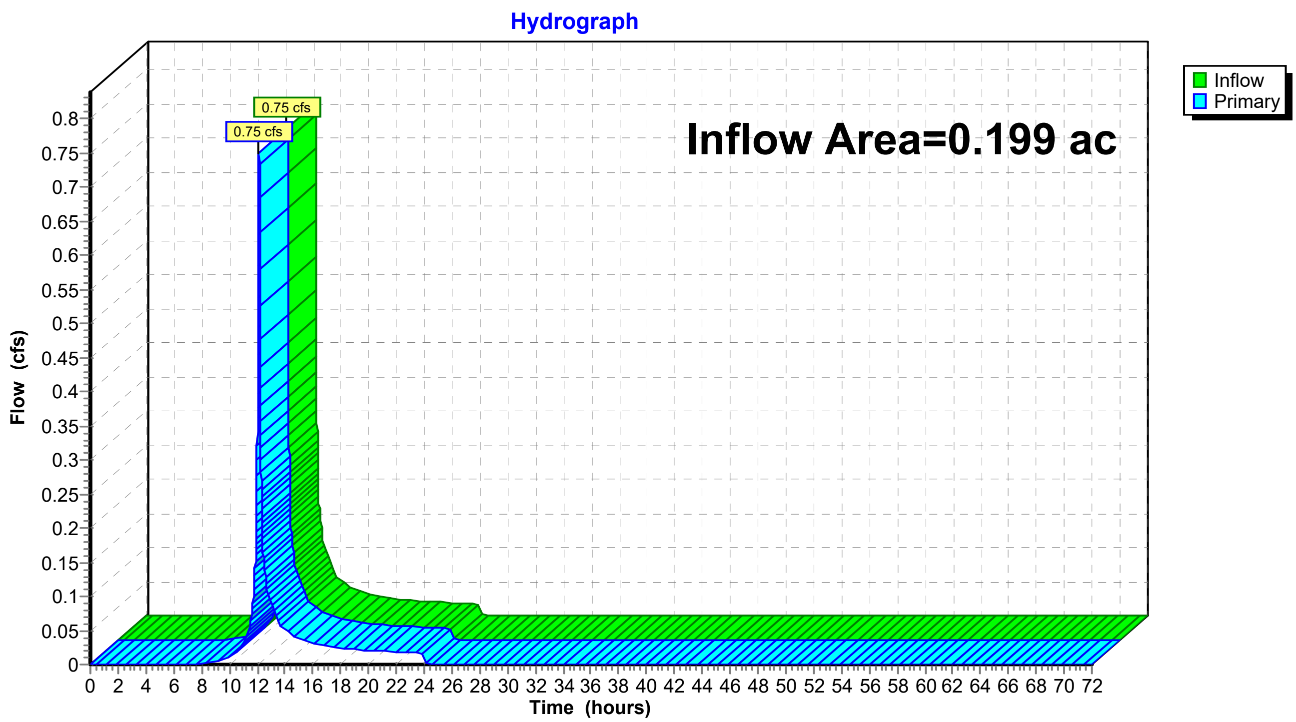


Summary for Link DP-2: Ditch

Inflow Area =	0.199 ac,	39.47% Impervious,	Inflow Depth = 3.37"	for 25-Year event
Inflow =	0.75 cfs @	12.13 hrs, Volume=	0.056 af	
Primary =	0.75 cfs @	12.13 hrs, Volume=	0.056 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Subcatchment1 Runoff Area=227,252 sf 38.51% Impervious Runoff Depth=6.67"
Tc=6.0 min CN=71 Runoff=38.24 cfs 2.901 af

Subcatchment2: Subcatchment2 Runoff Area=8,681 sf 39.47% Impervious Runoff Depth=5.73"
Tc=6.0 min CN=64 Runoff=1.27 cfs 0.095 af

Link DP-1: Reservoir and Swimming Area Inflow=38.24 cfs 2.901 af
Primary=38.24 cfs 2.901 af

Link DP-2: Ditch Inflow=1.27 cfs 0.095 af
Primary=1.27 cfs 0.095 af

Total Runoff Area = 5.416 ac Runoff Volume = 2.997 af Average Runoff Depth = 6.64"
61.46% Pervious = 3.329 ac 38.54% Impervious = 2.088 ac

Summary for Subcatchment 1: Subcatchment 1

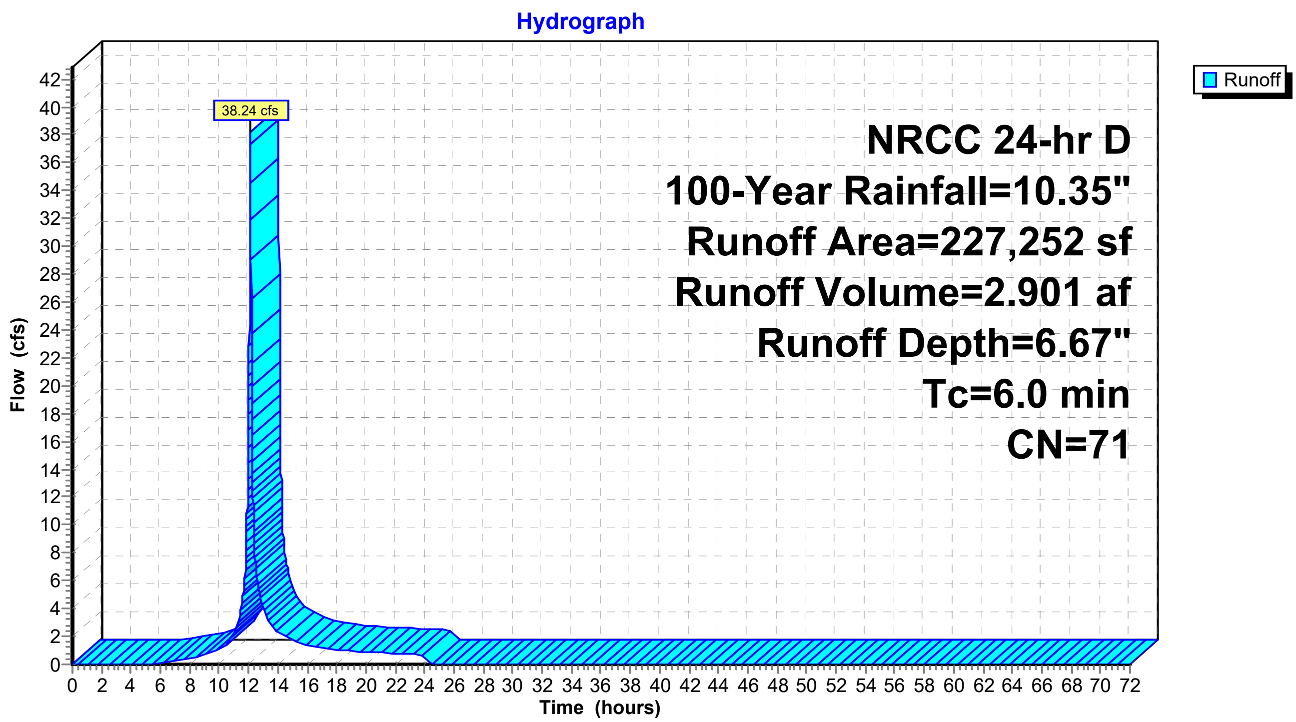
Runoff = 38.24 cfs @ 12.13 hrs, Volume= 2.901 af, Depth= 6.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-Year Rainfall=10.35"

	Area (sf)	CN	Description
	14,435	30	Brush, Good, HSG A
*	57,370	63	Beach Sand, HSG A
*	1,998	96	Dense Sand Path, HSG A
	63,530	49	50-75% Grass cover, Fair, HSG A
*	24,927	98	Gravel parking, HSG A
*	9,994	98	Impervious Surface, HSG A
	52,585	98	Water Surface, HSG A
*	2,413	39	Open Space, Good, HSG A (>75% Grass Cover)
	227,252	71	Weighted Average
	139,746		61.49% Pervious Area
	87,506		38.51% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1: Subcatchment 1



Summary for Subcatchment 2: Subcatchment 2

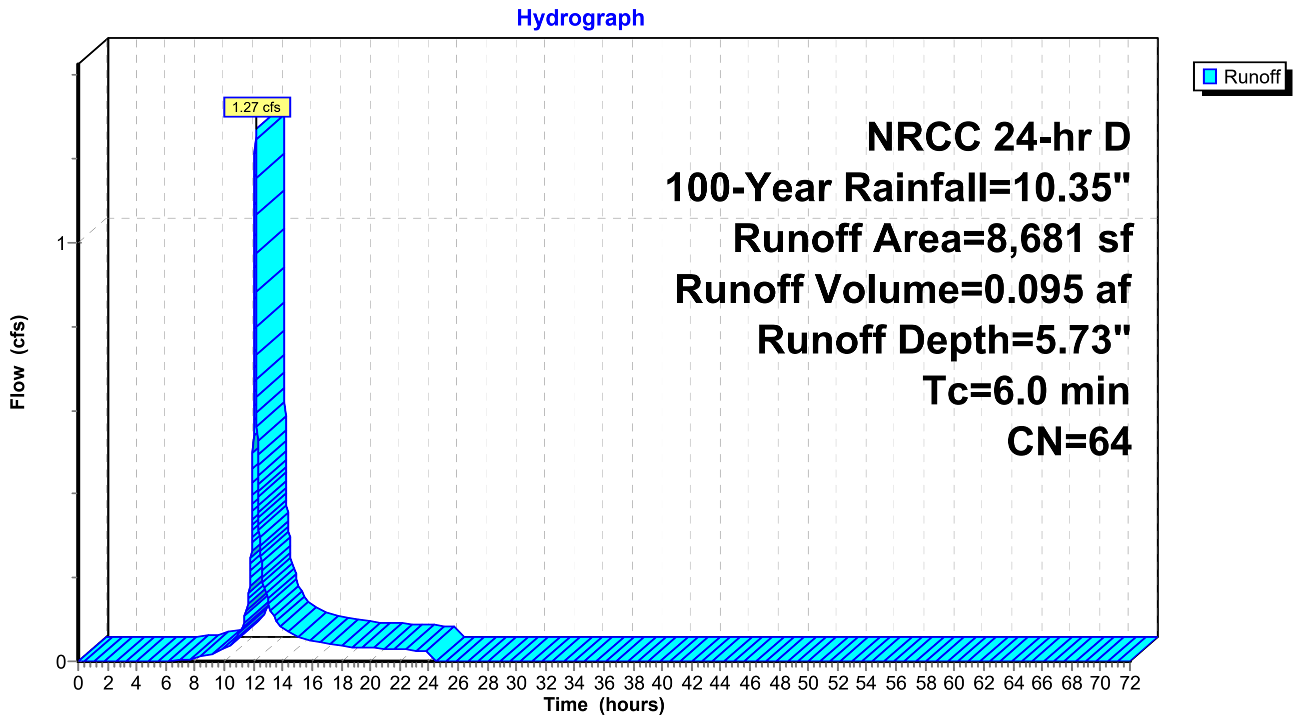
Runoff = 1.27 cfs @ 12.13 hrs, Volume= 0.095 af, Depth= 5.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-Year Rainfall=10.35"

	Area (sf)	CN	Description
	2,076	30	Brush, Good, HSG A
	3,179	49	50-75% Grass cover, Fair, HSG A
*	3,211	98	Gravel parking, HSG A
	215	98	Impervious Surface, HSG A
	8,681	64	Weighted Average
	5,255		60.53% Pervious Area
	3,426		39.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2

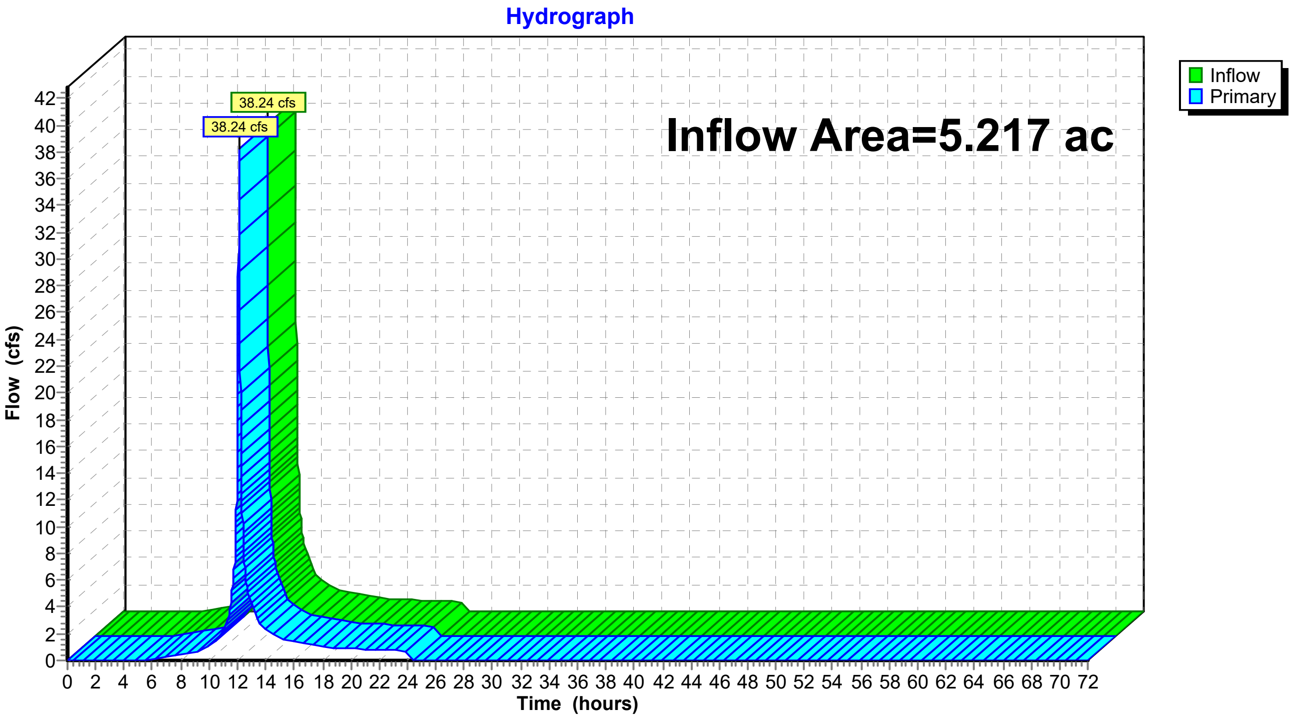


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area = 5.217 ac, 38.51% Impervious, Inflow Depth = 6.67" for 100-Year event
Inflow = 38.24 cfs @ 12.13 hrs, Volume= 2.901 af
Primary = 38.24 cfs @ 12.13 hrs, Volume= 2.901 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

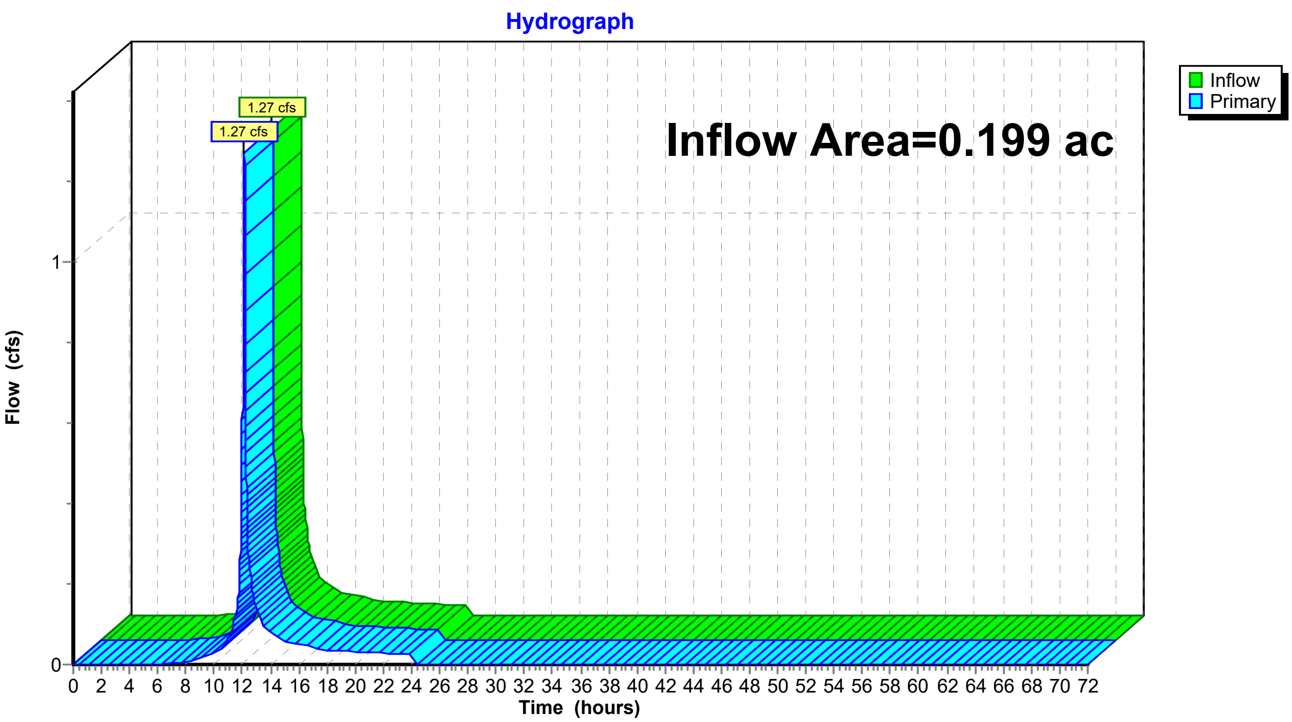


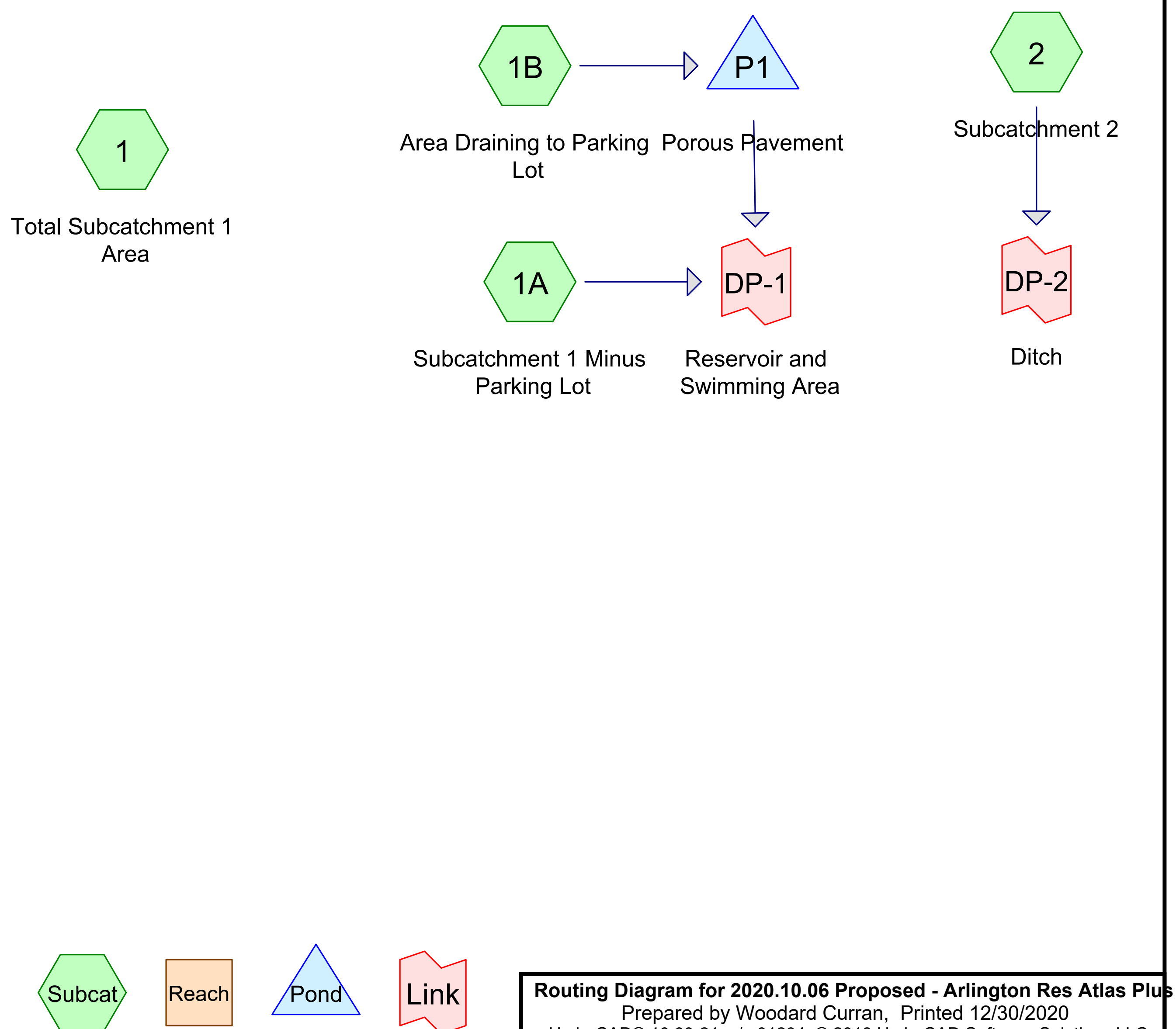
Summary for Link DP-2: Ditch

Inflow Area =	0.199 ac, 39.47% Impervious, Inflow Depth = 5.73"	for 100-Year event	
Inflow =	1.27 cfs @ 12.13 hrs, Volume=	0.095 af	
Primary =	1.27 cfs @ 12.13 hrs, Volume=	0.095 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch





Routing Diagram for 2020.10.06 Proposed - Arlington Res Atlas Plus
Prepared by Woodard Curran, Printed 12/30/2020
HydroCAD® 10.00-21 s/n 01204 © 2018 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.052	39	>75% Grass cover, Good, HSG A (1, 1A, 1B, 2)
2.058	63	Beach Sand, HSG A (1, 1A)
0.608	30	Brush, Good, HSG A (1, 1A)
0.934	98	Impervious Surface, HSG A (1, 1A, 1B)
0.184	39	Permeable Playground Surface, Good, HSG A (1A)
0.184	39	Permeable Playground Surfaces, Good, HSG A (1)
1.042	98	Porous Pavement, HSG A (1, 1A, 1B)
0.276	96	Stone Dust, HSG A (1, 1A)
2.401	98	Water Surface, HSG A (1, 1A)
10.738	**69**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
10.738	HSG A	1, 1A, 1B, 2
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
10.738		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatc Number
3.052	0.000	0.000	0.000	0.000	3.052	>75% Grass cover, Good	
2.058	0.000	0.000	0.000	0.000	2.058	Beach Sand	
0.608	0.000	0.000	0.000	0.000	0.608	Brush, Good	
0.934	0.000	0.000	0.000	0.000	0.934	Impervious Surface	
0.184	0.000	0.000	0.000	0.000	0.184	Permeable Playground Surface, Good	
0.184	0.000	0.000	0.000	0.000	0.184	Permeable Playground Surfaces, Good	
1.042	0.000	0.000	0.000	0.000	1.042	Porous Pavement	
0.276	0.000	0.000	0.000	0.000	0.276	Stone Dust	
2.401	0.000	0.000	0.000	0.000	2.401	Water Surface	
10.738	**0.000**	**0.000**	**0.000**	**0.000**	**10.738**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	P1	162.15	162.05	20.0	0.0050	0.013	12.0	0.0	0.0

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Total Subcatchment1 Runoff Area=231,818 sf 41.12% Impervious Runoff Depth=0.63"
Tc=6.0 min CN=69 Runoff=3.32 cfs 0.281 af

Subcatchment1A: Subcatchment1 Runoff Area=201,945 sf 36.57% Impervious Runoff Depth=0.55"
Tc=6.0 min CN=67 Runoff=2.38 cfs 0.213 af

Subcatchment1B: Area Draining to Runoff Area=29,873 sf 71.84% Impervious Runoff Depth=1.26"
Tc=6.0 min CN=81 Runoff=0.96 cfs 0.072 af

Subcatchment2: Subcatchment2 Runoff Area=4,115 sf 0.00% Impervious Runoff Depth=0.00"
Tc=6.0 min CN=39 Runoff=0.00 cfs 0.000 af

Pond P1: Porous Pavement Peak Elev=161.40' Storage=0 cf Inflow=0.96 cfs 0.072 af
Discarded=0.96 cfs 0.072 af Primary=0.00 cfs 0.000 af Outflow=0.96 cfs 0.072 af

Link DP-1: Reservoir and Swimming Area Inflow=2.38 cfs 0.213 af
Primary=2.38 cfs 0.213 af

Link DP-2: Ditch Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 10.738 ac Runoff Volume = 0.565 af Average Runoff Depth = 0.63"
59.24% Pervious = 6.362 ac 40.76% Impervious = 4.376 ac

Summary for Subcatchment 1: Total Subcatchment 1 Area

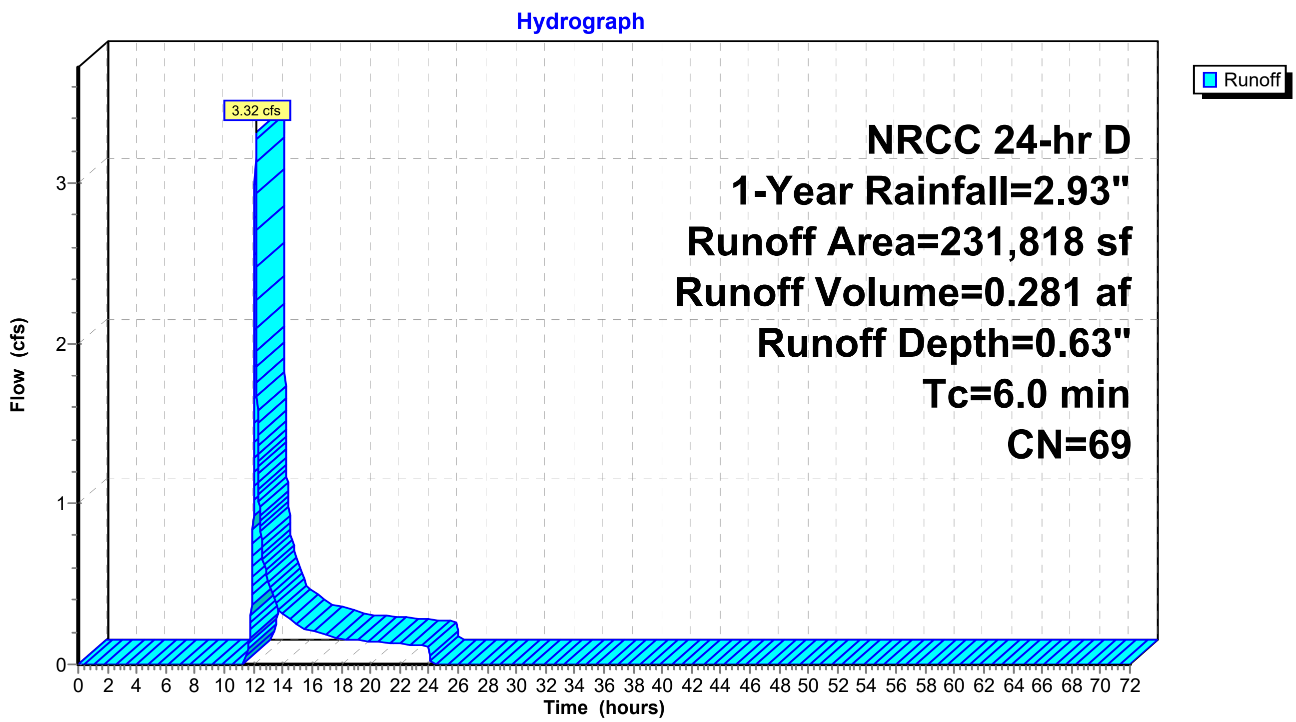
Runoff = 3.32 cfs @ 12.14 hrs, Volume= 0.281 af, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 1-Year Rainfall=2.93"

	Area (sf)	CN	Description
	13,237	30	Brush, Good, HSG A
*	44,830	63	Beach Sand, HSG A
	64,412	39	>75% Grass cover, Good, HSG A
	20,338	98	Impervious Surface, HSG A
*	22,688	98	Porous Pavement, HSG A
	52,292	98	Water Surface, HSG A
*	6,010	96	Stone Dust, HSG A
*	8,011	39	Permeable Playground Surfaces, Good, HSG A
	231,818	69	Weighted Average
	136,500		58.88% Pervious Area
	95,318		41.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1: Total Subcatchment 1 Area



Summary for Subcatchment 1A: Subcatchment 1 Minus Parking Lot

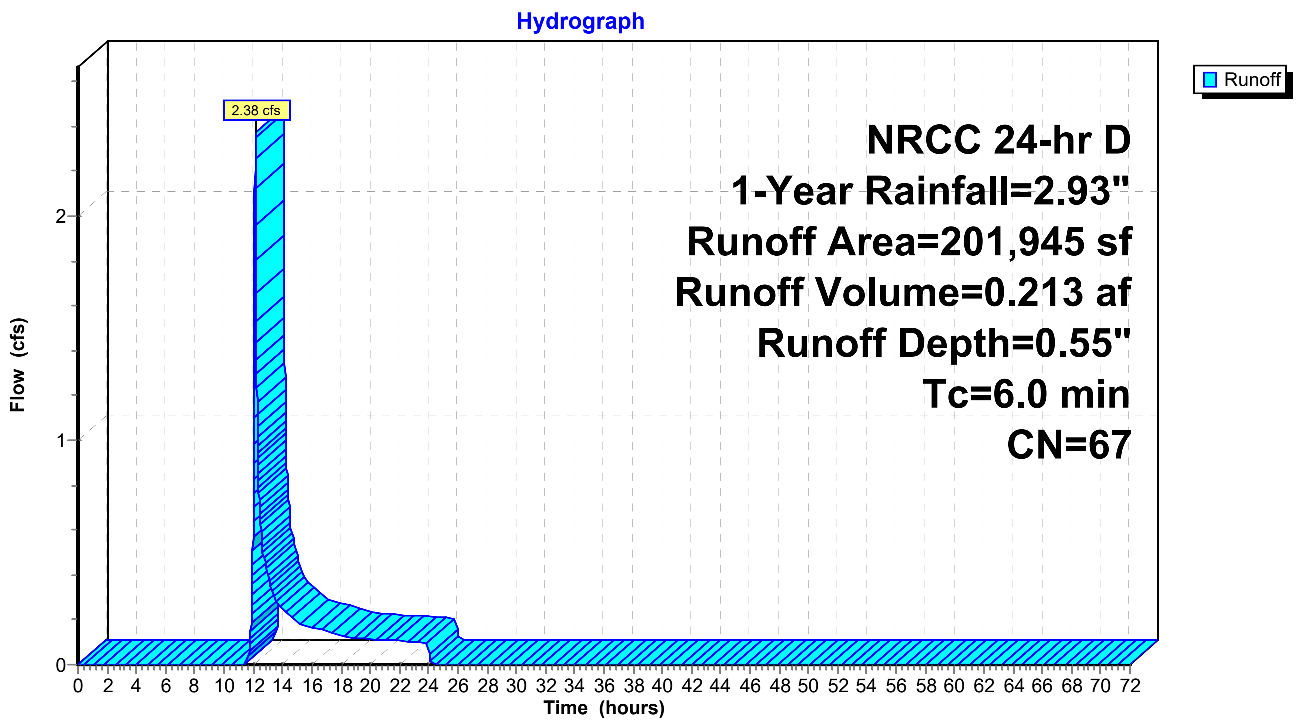
Runoff = 2.38 cfs @ 12.14 hrs, Volume= 0.213 af, Depth= 0.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 1-Year Rainfall=2.93"

	Area (sf)	CN	Description
	13,237	30	Brush, Good, HSG A
*	44,830	63	Beach Sand, HSG A
	56,001	39	>75% Grass cover, Good, HSG A
	19,764	98	Impervious Surface, HSG A
*	1,800	98	Porous Pavement, HSG A
	52,292	98	Water Surface, HSG A
*	6,010	96	Stone Dust, HSG A
*	8,011	39	Permeable Playground Surface, Good, HSG A
	201,945	67	Weighted Average
	128,089		63.43% Pervious Area
	73,856		36.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1A: Subcatchment 1 Minus Parking Lot



Summary for Subcatchment 1B: Area Draining to Parking Lot

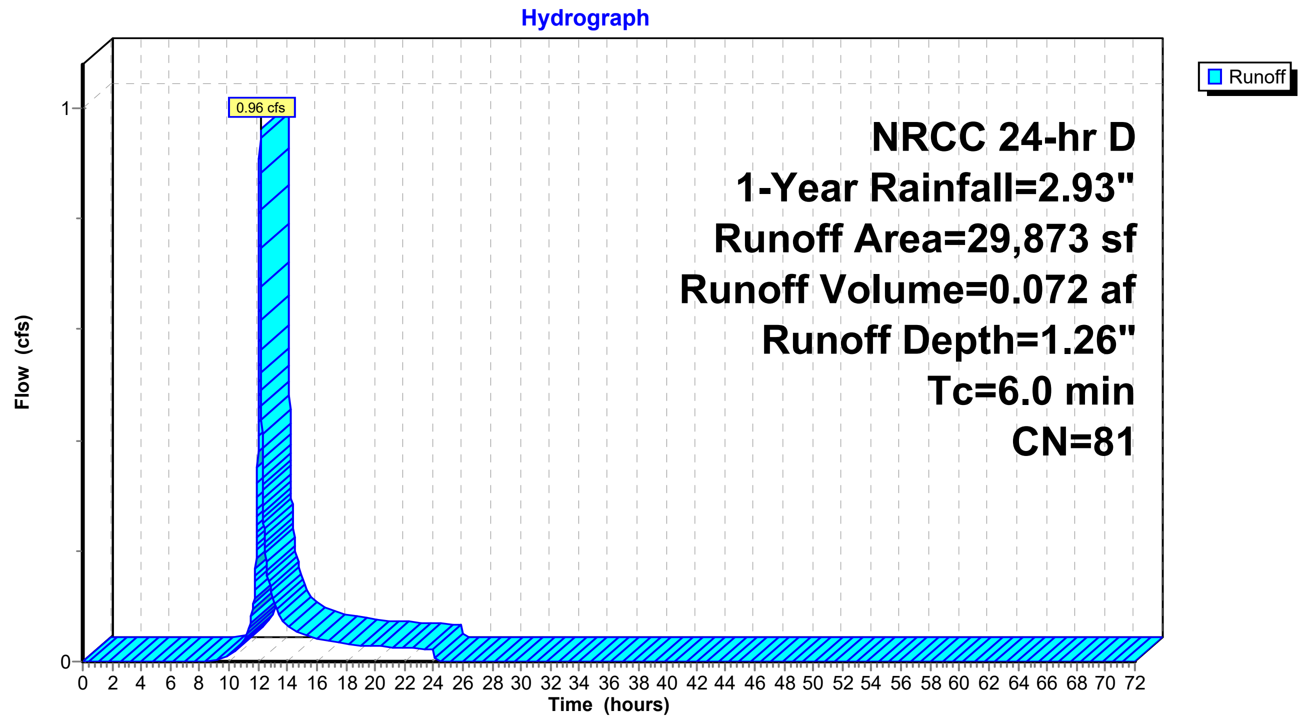
Runoff = 0.96 cfs @ 12.13 hrs, Volume= 0.072 af, Depth= 1.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 1-Year Rainfall=2.93"

	Area (sf)	CN	Description
	8,411	39	>75% Grass cover, Good, HSG A
	574	98	Impervious Surface, HSG A
*	20,888	98	Porous Pavement, HSG A
	29,873	81	Weighted Average
	8,411		28.16% Pervious Area
	21,462		71.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1B: Area Draining to Parking Lot



Summary for Subcatchment 2: Subcatchment 2

[45] Hint: Runoff=Zero

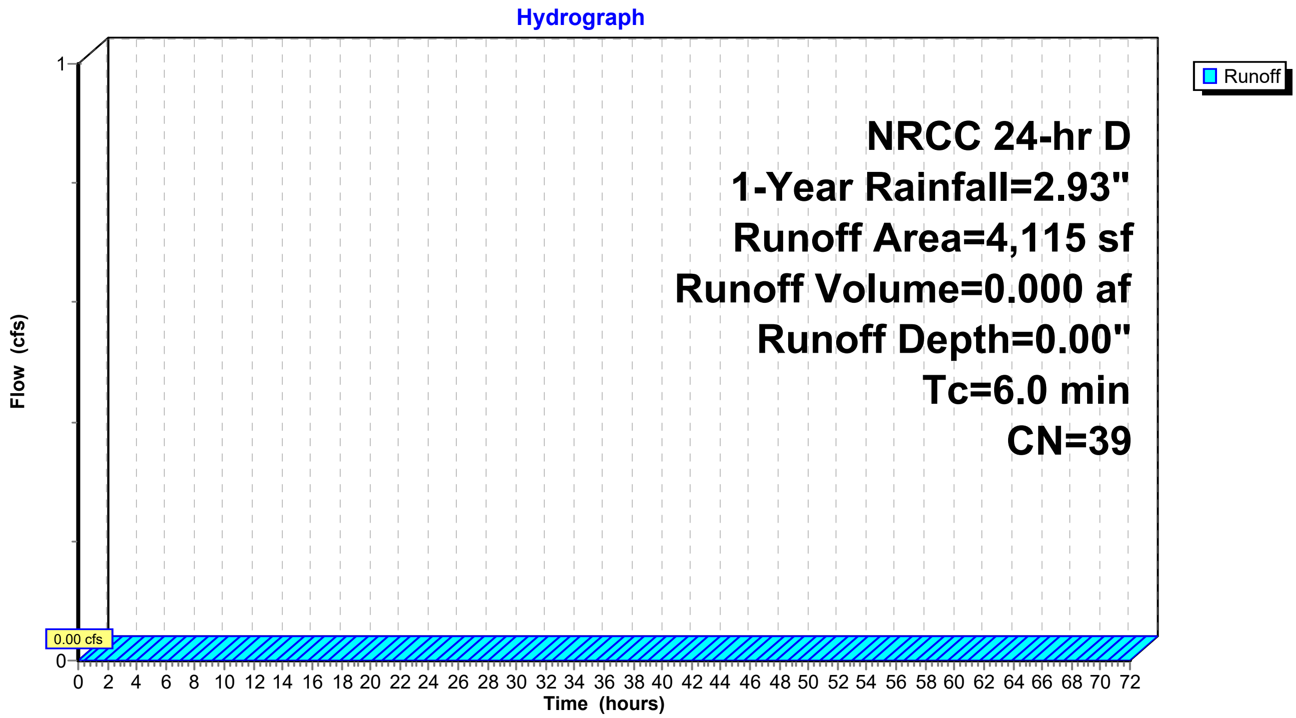
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 1-Year Rainfall=2.93"

Area (sf)	CN	Description
4,115	39	>75% Grass cover, Good, HSG A
4,115		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2



Summary for Pond P1: Porous Pavement

Inflow Area = 0.686 ac, 71.84% Impervious, Inflow Depth = 1.26" for 1-Year event
Inflow = 0.96 cfs @ 12.13 hrs, Volume= 0.072 af
Outflow = 0.96 cfs @ 12.13 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.96 cfs @ 12.13 hrs, Volume= 0.072 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 161.40' @ 12.13 hrs Surf.Area= 21,411 sf Storage= 0 cf
Flood Elev= 164.00' Surf.Area= 42,822 sf Storage= 11,383 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (872.1 - 872.1)

Volume	Invert	Avail.Storage	Storage Description
#1	161.40'	7,099 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 17,771 cf Overall - 23 cf Embedded = 17,749 cf x 40.0% Voids
#2	162.23'	4,261 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#3	161.73'	23 cf	**4.0" Round Pipe Storage** Inside #1 L= 258.0'
		11,383 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
161.40	21,411	0	0
162.23	21,411	17,771	17,771

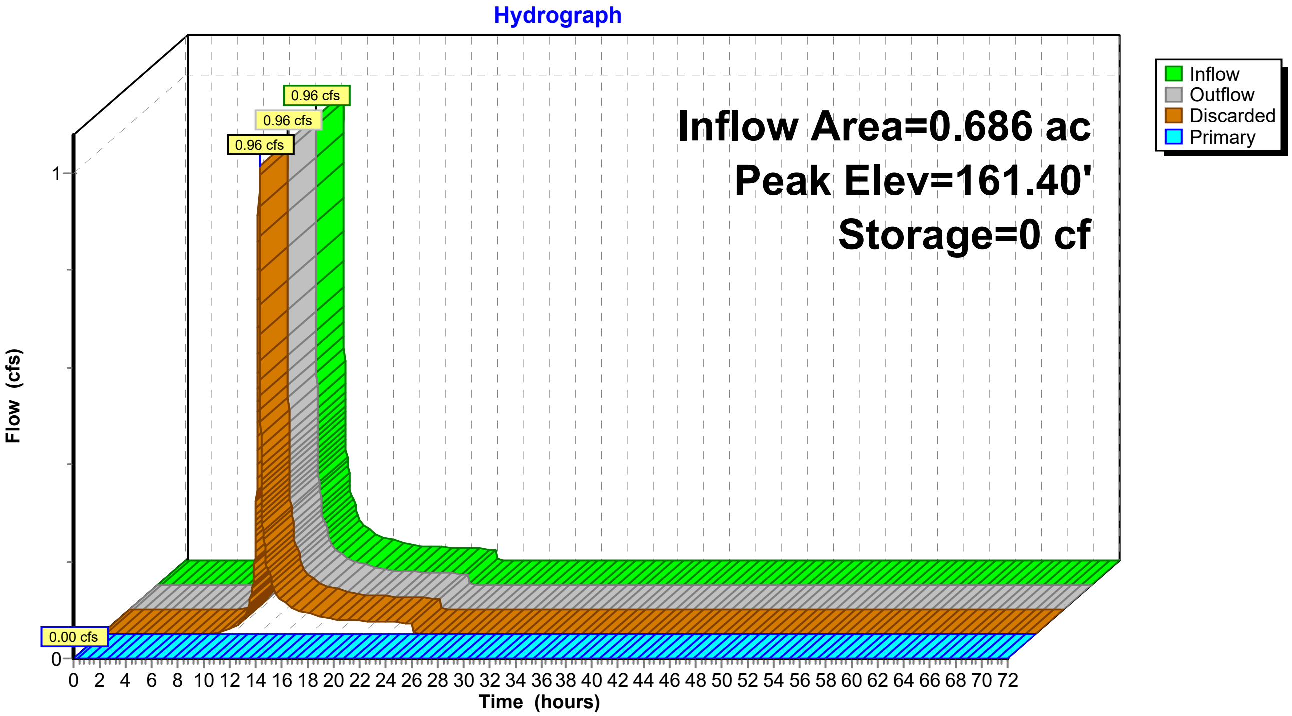
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
162.23	21,411	0.0	0	0
162.48	21,411	40.0	2,141	2,141
162.81	21,411	30.0	2,120	4,261

Device	Routing	Invert	Outlet Devices
#1	Primary	162.15'	**12.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 162.15' / 162.05' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	161.73'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	161.40'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.19 cfs @ 12.13 hrs HW=161.40' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.40' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond P1: Porous Pavement

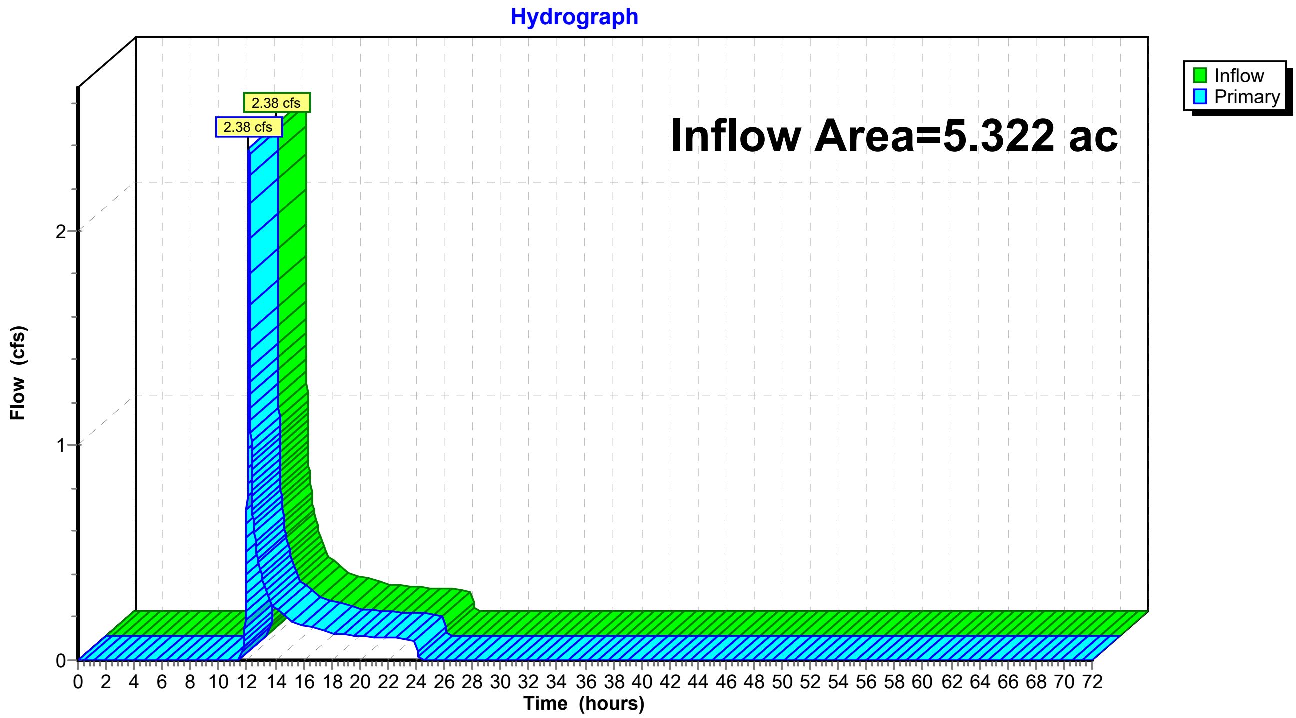


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.322 ac,	41.12% Impervious,	Inflow Depth = 0.48"	for 1-Year event
Inflow =	2.38 cfs @	12.14 hrs, Volume=	0.213 af	
Primary =	2.38 cfs @	12.14 hrs, Volume=	0.213 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

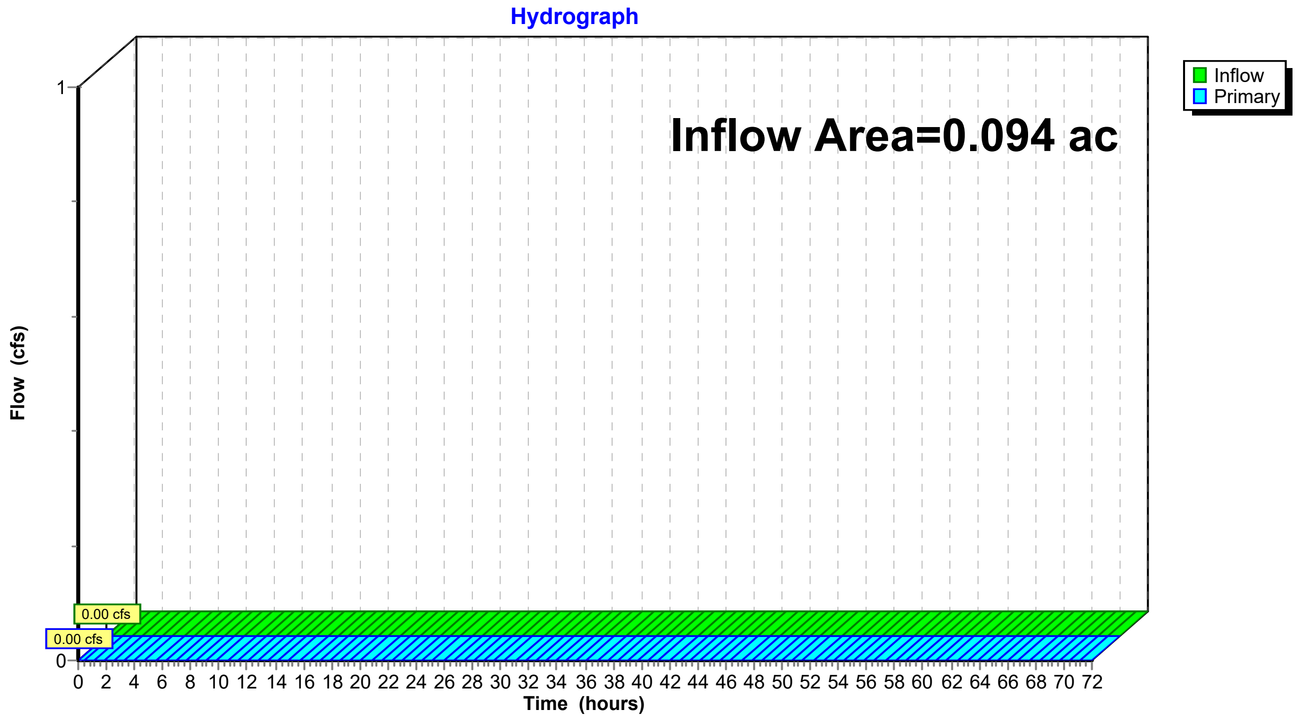


Summary for Link DP-2: Ditch

Inflow Area =	0.094 ac,	0.00% Impervious,	Inflow Depth = 0.00"	for 1-Year event	
Inflow =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Total Subcatchment1 Runoff Area=231,818 sf 41.12% Impervious Runoff Depth=1.04"
Tc=6.0 min CN=69 Runoff=5.88 cfs 0.461 af

Subcatchment1A: Subcatchment1 Runoff Area=201,945 sf 36.57% Impervious Runoff Depth=0.93"
Tc=6.0 min CN=67 Runoff=4.47 cfs 0.359 af

Subcatchment1B: Area Draining to Runoff Area=29,873 sf 71.84% Impervious Runoff Depth=1.82"
Tc=6.0 min CN=81 Runoff=1.40 cfs 0.104 af

Subcatchment2: Subcatchment2 Runoff Area=4,115 sf 0.00% Impervious Runoff Depth=0.02"
Tc=6.0 min CN=39 Runoff=0.00 cfs 0.000 af

Pond P1: Porous Pavement Peak Elev=161.40' Storage=37 cf Inflow=1.40 cfs 0.104 af
Discarded=1.19 cfs 0.104 af Primary=0.00 cfs 0.000 af Outflow=1.19 cfs 0.104 af

Link DP-1: Reservoir and Swimming Area Inflow=4.47 cfs 0.359 af
Primary=4.47 cfs 0.359 af

Link DP-2: Ditch Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 10.738 ac Runoff Volume = 0.924 af Average Runoff Depth = 1.03"
59.24% Pervious = 6.362 ac 40.76% Impervious = 4.376 ac

Summary for Subcatchment 1: Total Subcatchment 1 Area

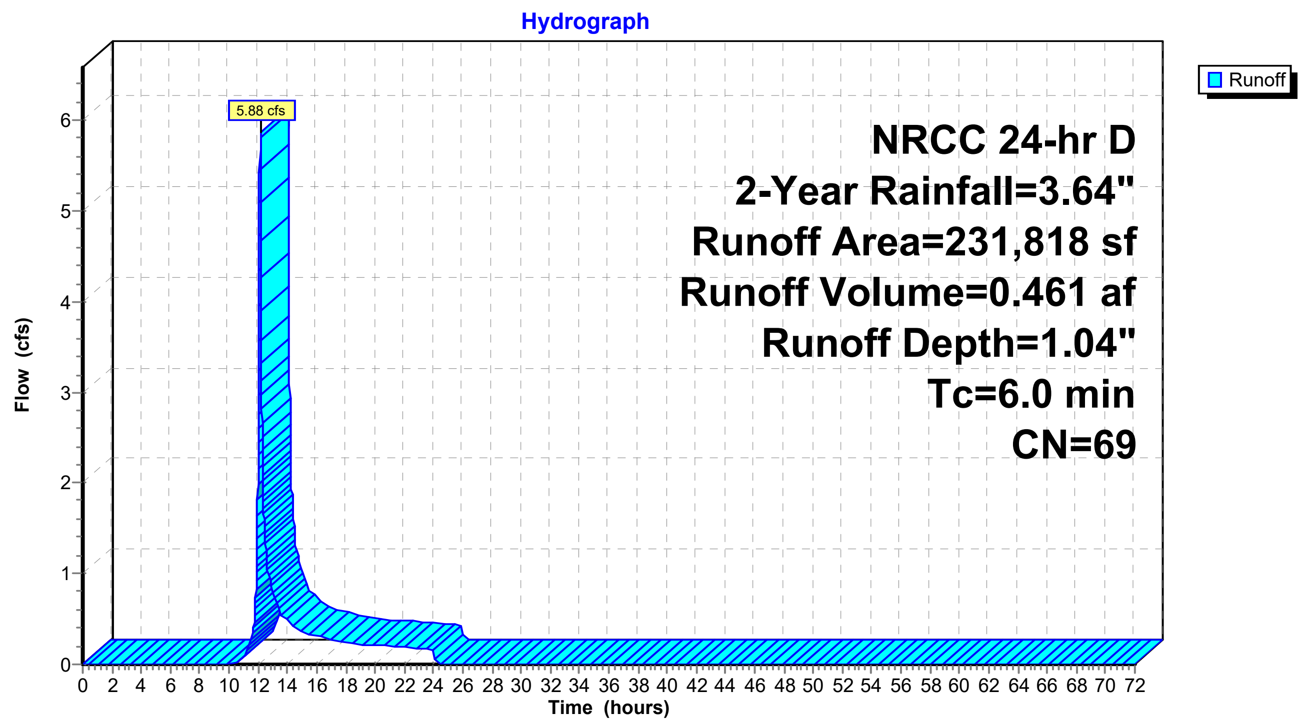
Runoff = 5.88 cfs @ 12.14 hrs, Volume= 0.461 af, Depth= 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-Year Rainfall=3.64"

	Area (sf)	CN	Description
	13,237	30	Brush, Good, HSG A
*	44,830	63	Beach Sand, HSG A
	64,412	39	>75% Grass cover, Good, HSG A
	20,338	98	Impervious Surface, HSG A
*	22,688	98	Porous Pavement, HSG A
	52,292	98	Water Surface, HSG A
*	6,010	96	Stone Dust, HSG A
*	8,011	39	Permeable Playground Surfaces, Good, HSG A
	231,818	69	Weighted Average
	136,500		58.88% Pervious Area
	95,318		41.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1: Total Subcatchment 1 Area



Summary for Subcatchment 1A: Subcatchment 1 Minus Parking Lot

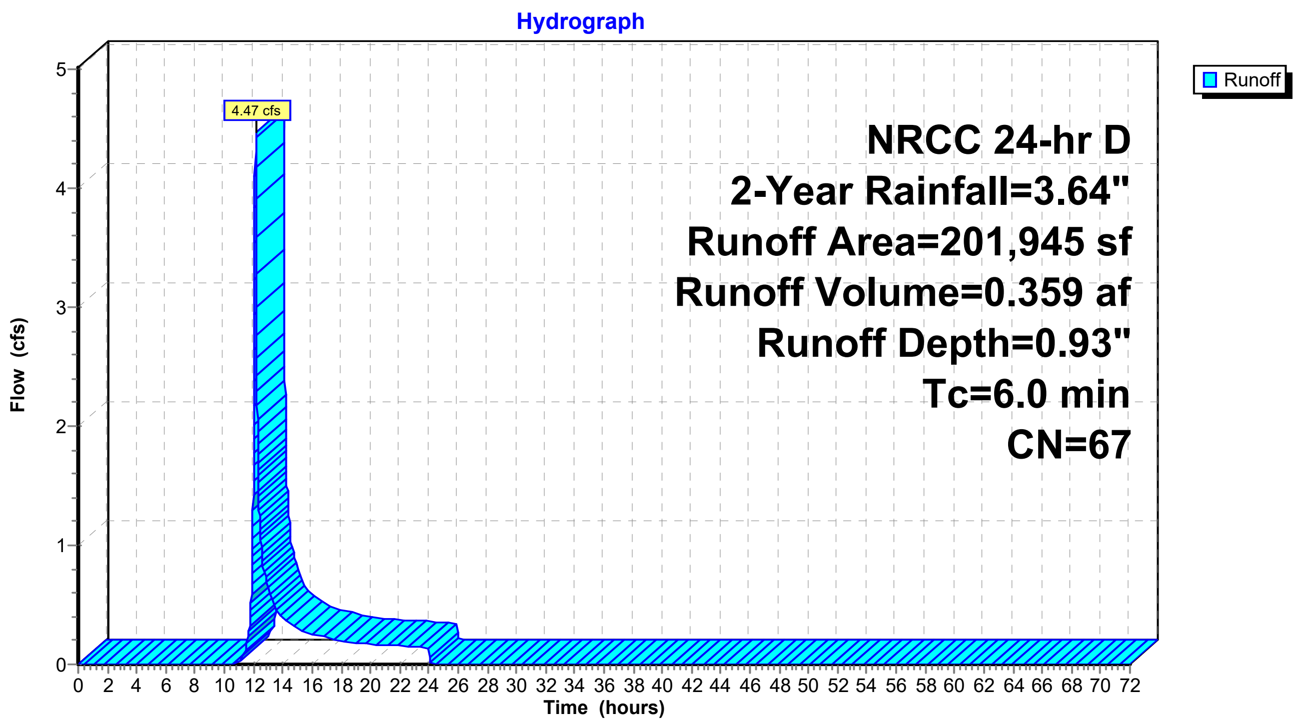
Runoff = 4.47 cfs @ 12.14 hrs, Volume= 0.359 af, Depth= 0.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-Year Rainfall=3.64"

	Area (sf)	CN	Description
	13,237	30	Brush, Good, HSG A
*	44,830	63	Beach Sand, HSG A
	56,001	39	>75% Grass cover, Good, HSG A
	19,764	98	Impervious Surface, HSG A
*	1,800	98	Porous Pavement, HSG A
	52,292	98	Water Surface, HSG A
*	6,010	96	Stone Dust, HSG A
*	8,011	39	Permeable Playground Surface, Good, HSG A
	201,945	67	Weighted Average
	128,089		63.43% Pervious Area
	73,856		36.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1A: Subcatchment 1 Minus Parking Lot



Summary for Subcatchment 1B: Area Draining to Parking Lot

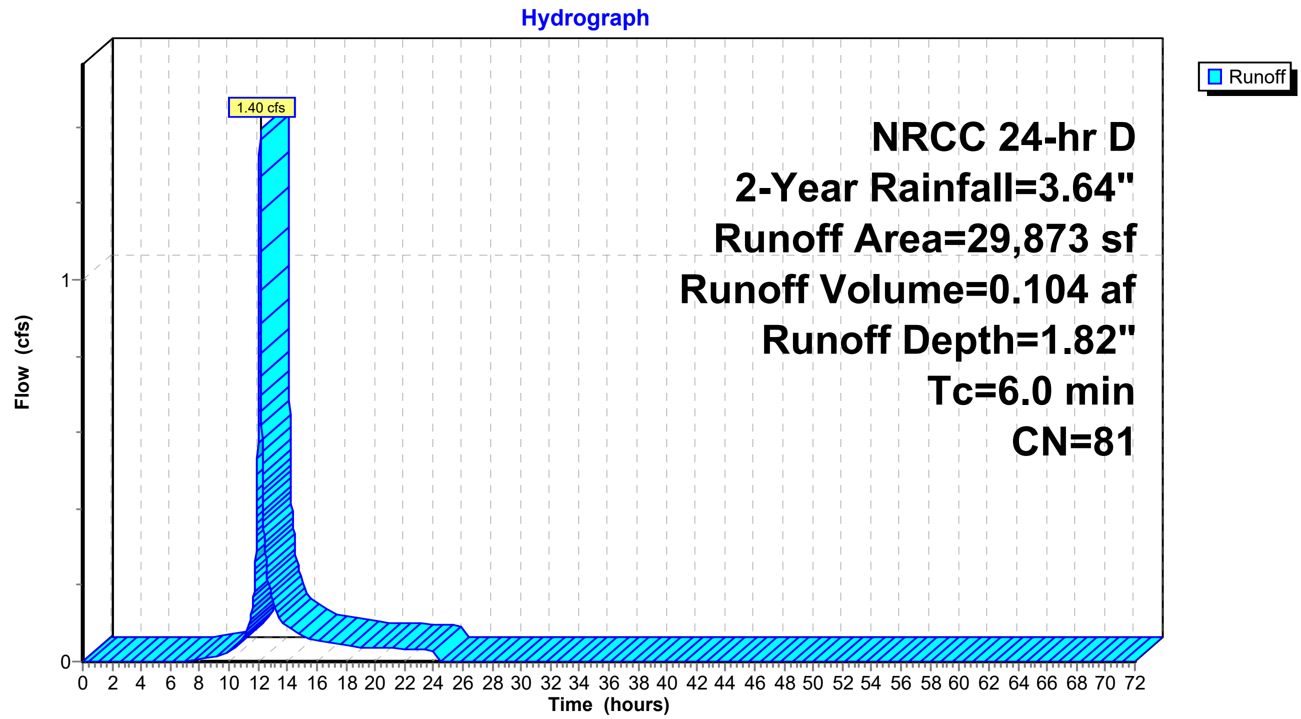
Runoff = 1.40 cfs @ 12.13 hrs, Volume= 0.104 af, Depth= 1.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-Year Rainfall=3.64"

	Area (sf)	CN	Description
	8,411	39	>75% Grass cover, Good, HSG A
	574	98	Impervious Surface, HSG A
*	20,888	98	Porous Pavement, HSG A
	29,873	81	Weighted Average
	8,411		28.16% Pervious Area
	21,462		71.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1B: Area Draining to Parking Lot



Summary for Subcatchment 2: Subcatchment 2

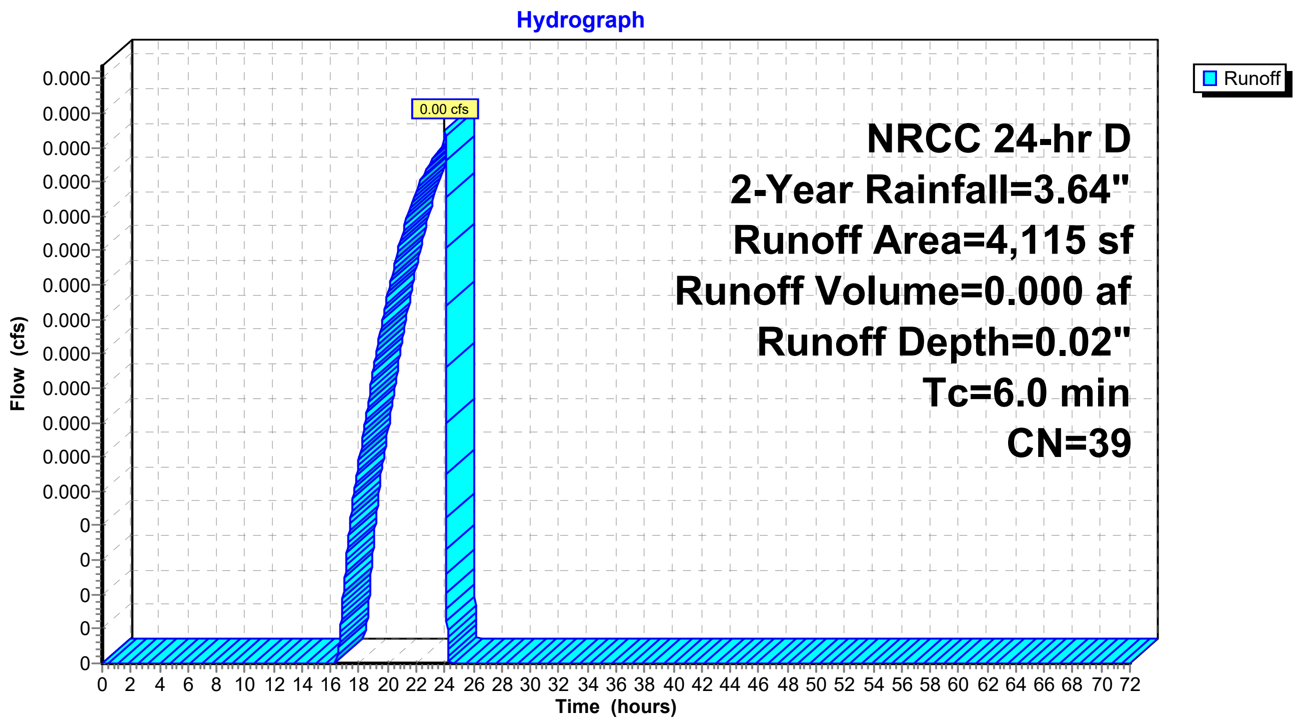
Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-Year Rainfall=3.64"

Area (sf)	CN	Description
4,115	39	>75% Grass cover, Good, HSG A
4,115		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2



Summary for Pond P1: Porous Pavement

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=595)

Inflow Area = 0.686 ac, 71.84% Impervious, Inflow Depth = 1.82" for 2-Year event
Inflow = 1.40 cfs @ 12.13 hrs, Volume= 0.104 af
Outflow = 1.19 cfs @ 12.16 hrs, Volume= 0.104 af, Atten= 14%, Lag= 1.4 min
Discarded = 1.19 cfs @ 12.16 hrs, Volume= 0.104 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 161.40' @ 12.17 hrs Surf.Area= 21,411 sf Storage= 37 cf
Flood Elev= 164.00' Surf.Area= 42,822 sf Storage= 11,383 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (858.5 - 858.4)

Volume	Invert	Avail.Storage	Storage Description
#1	161.40'	7,099 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 17,771 cf Overall - 23 cf Embedded = 17,749 cf x 40.0% Voids
#2	162.23'	4,261 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#3	161.73'	23 cf	**4.0" Round Pipe Storage** Inside #1 L= 258.0'
		11,383 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
161.40	21,411	0	0
162.23	21,411	17,771	17,771

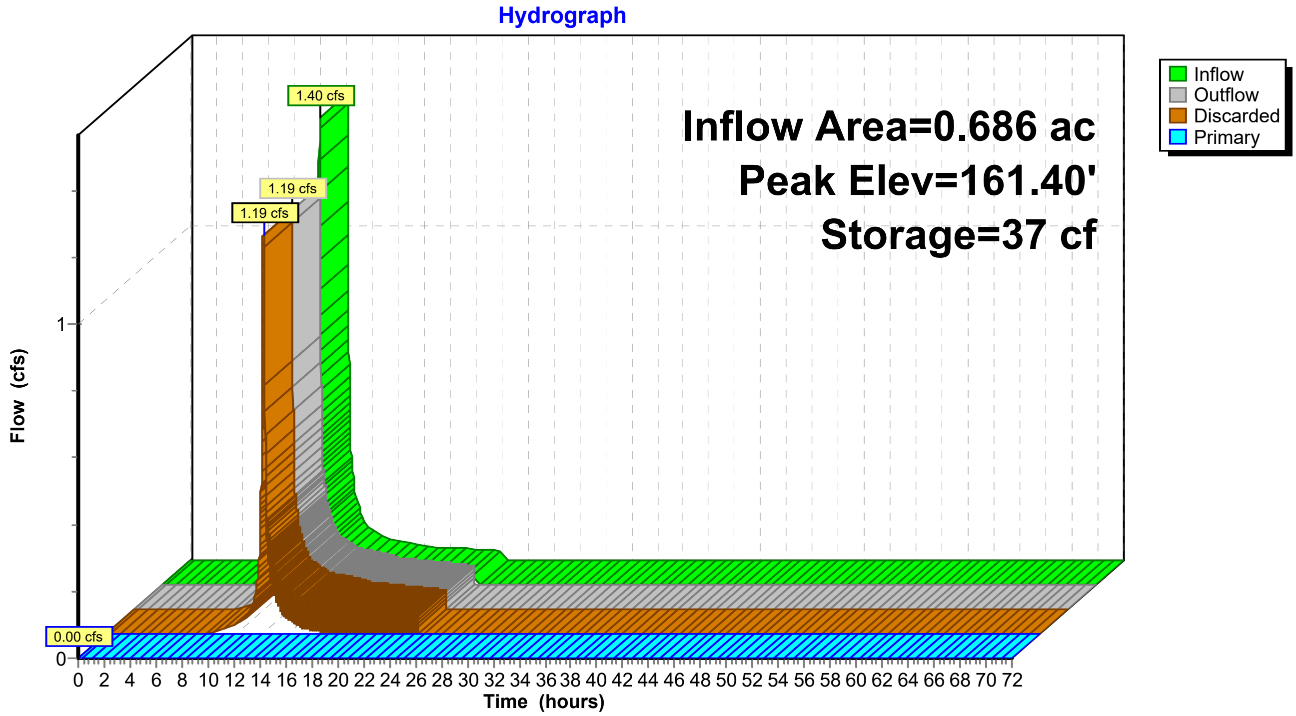
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
162.23	21,411	0.0	0	0
162.48	21,411	40.0	2,141	2,141
162.81	21,411	30.0	2,120	4,261

Device	Routing	Invert	Outlet Devices
#1	Primary	162.15'	**12.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 162.15' / 162.05' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	161.73'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	161.40'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.19 cfs @ 12.16 hrs HW=161.40' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.40' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond P1: Porous Pavement

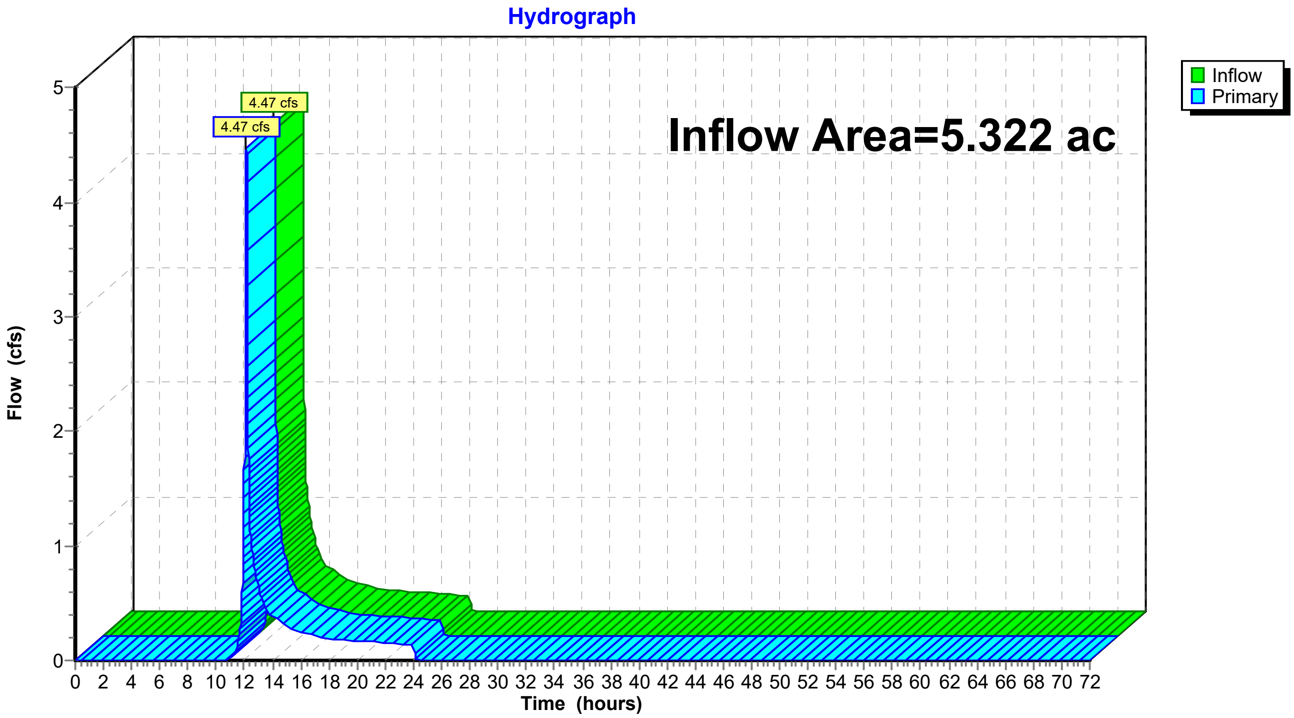


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.322 ac, 41.12% Impervious, Inflow Depth = 0.81" for 2-Year event		
Inflow =	4.47 cfs @ 12.14 hrs, Volume=	0.359 af	
Primary =	4.47 cfs @ 12.14 hrs, Volume=	0.359 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

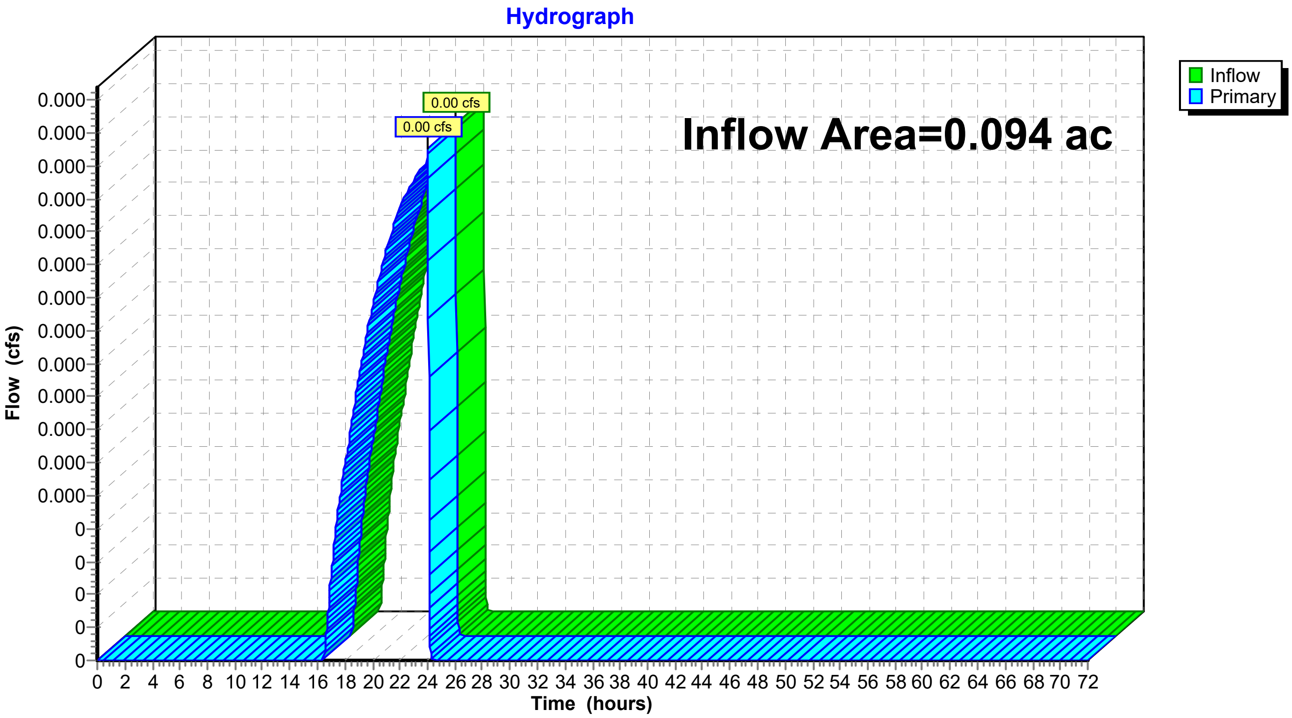


Summary for Link DP-2: Ditch

Inflow Area =	0.094 ac,	0.00% Impervious, Inflow Depth =	0.02"	for 2-Year event
Inflow =	0.00 cfs @	24.01 hrs, Volume=	0.000 af	
Primary =	0.00 cfs @	24.01 hrs, Volume=	0.000 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Total Subcatchment1 Runoff Area=231,818 sf 41.12% Impervious Runoff Depth=2.55"
Tc=6.0 min CN=69 Runoff=15.13 cfs 1.131 af

Subcatchment1A: Subcatchment1 Runoff Area=201,945 sf 36.57% Impervious Runoff Depth=2.37"
Tc=6.0 min CN=67 Runoff=12.22 cfs 0.917 af

Subcatchment1B: Area Draining to Runoff Area=29,873 sf 71.84% Impervious Runoff Depth=3.69"
Tc=6.0 min CN=81 Runoff=2.79 cfs 0.211 af

Subcatchment2: Subcatchment2 Runoff Area=4,115 sf 0.00% Impervious Runoff Depth=0.39"
Tc=6.0 min CN=39 Runoff=0.01 cfs 0.003 af

Pond P1: Porous Pavement Peak Elev=161.49' Storage=748 cf Inflow=2.79 cfs 0.211 af
Discarded=1.19 cfs 0.211 af Primary=0.00 cfs 0.000 af Outflow=1.19 cfs 0.211 af

Link DP-1: Reservoir and Swimming Area Inflow=12.22 cfs 0.917 af
Primary=12.22 cfs 0.917 af

Link DP-2: Ditch Inflow=0.01 cfs 0.003 af
Primary=0.01 cfs 0.003 af

Total Runoff Area = 10.738 ac Runoff Volume = 2.261 af Average Runoff Depth = 2.53"
59.24% Pervious = 6.362 ac 40.76% Impervious = 4.376 ac

Summary for Subcatchment 1: Total Subcatchment 1 Area

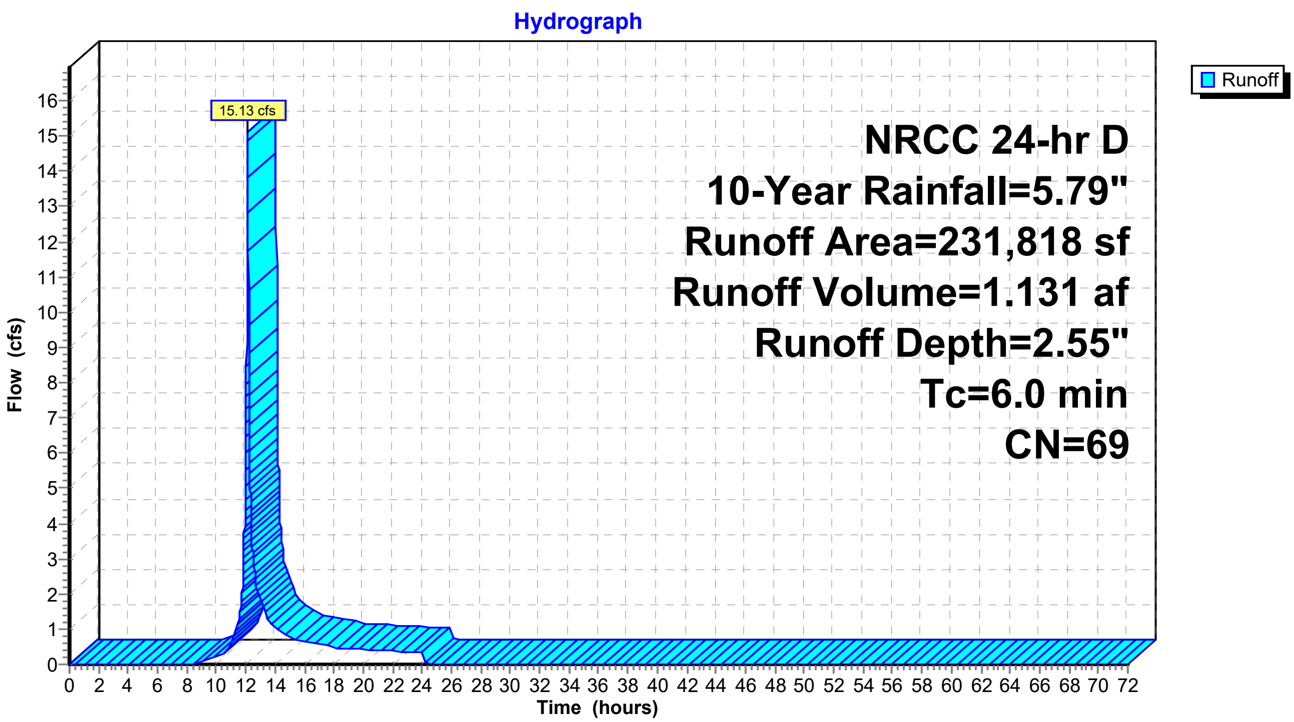
Runoff = 15.13 cfs @ 12.13 hrs, Volume= 1.131 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-Year Rainfall=5.79"

	Area (sf)	CN	Description
	13,237	30	Brush, Good, HSG A
*	44,830	63	Beach Sand, HSG A
	64,412	39	>75% Grass cover, Good, HSG A
	20,338	98	Impervious Surface, HSG A
*	22,688	98	Porous Pavement, HSG A
	52,292	98	Water Surface, HSG A
*	6,010	96	Stone Dust, HSG A
*	8,011	39	Permeable Playground Surfaces, Good, HSG A
	231,818	69	Weighted Average
	136,500		58.88% Pervious Area
	95,318		41.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1: Total Subcatchment 1 Area



Summary for Subcatchment 1A: Subcatchment 1 Minus Parking Lot

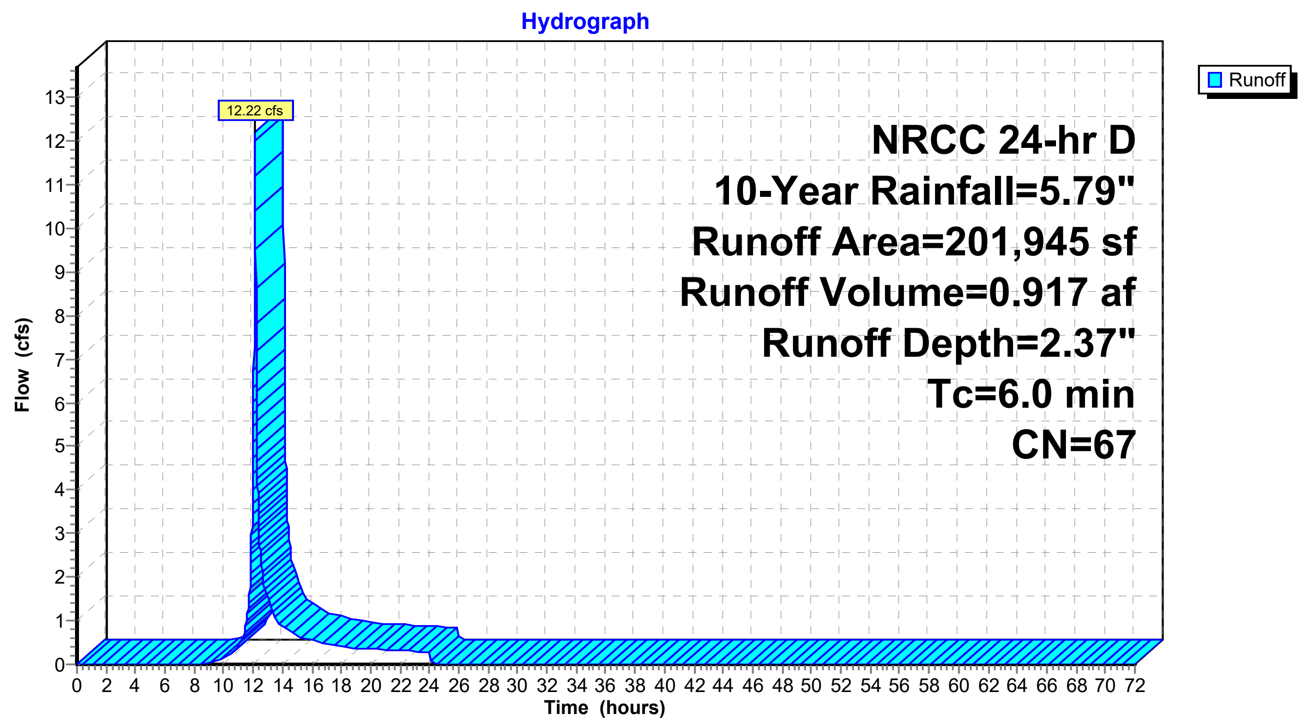
Runoff = 12.22 cfs @ 12.13 hrs, Volume= 0.917 af, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-Year Rainfall=5.79"

	Area (sf)	CN	Description
	13,237	30	Brush, Good, HSG A
*	44,830	63	Beach Sand, HSG A
	56,001	39	>75% Grass cover, Good, HSG A
	19,764	98	Impervious Surface, HSG A
*	1,800	98	Porous Pavement, HSG A
	52,292	98	Water Surface, HSG A
*	6,010	96	Stone Dust, HSG A
*	8,011	39	Permeable Playground Surface, Good, HSG A
	201,945	67	Weighted Average
	128,089		63.43% Pervious Area
	73,856		36.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1A: Subcatchment 1 Minus Parking Lot



Summary for Subcatchment 1B: Area Draining to Parking Lot

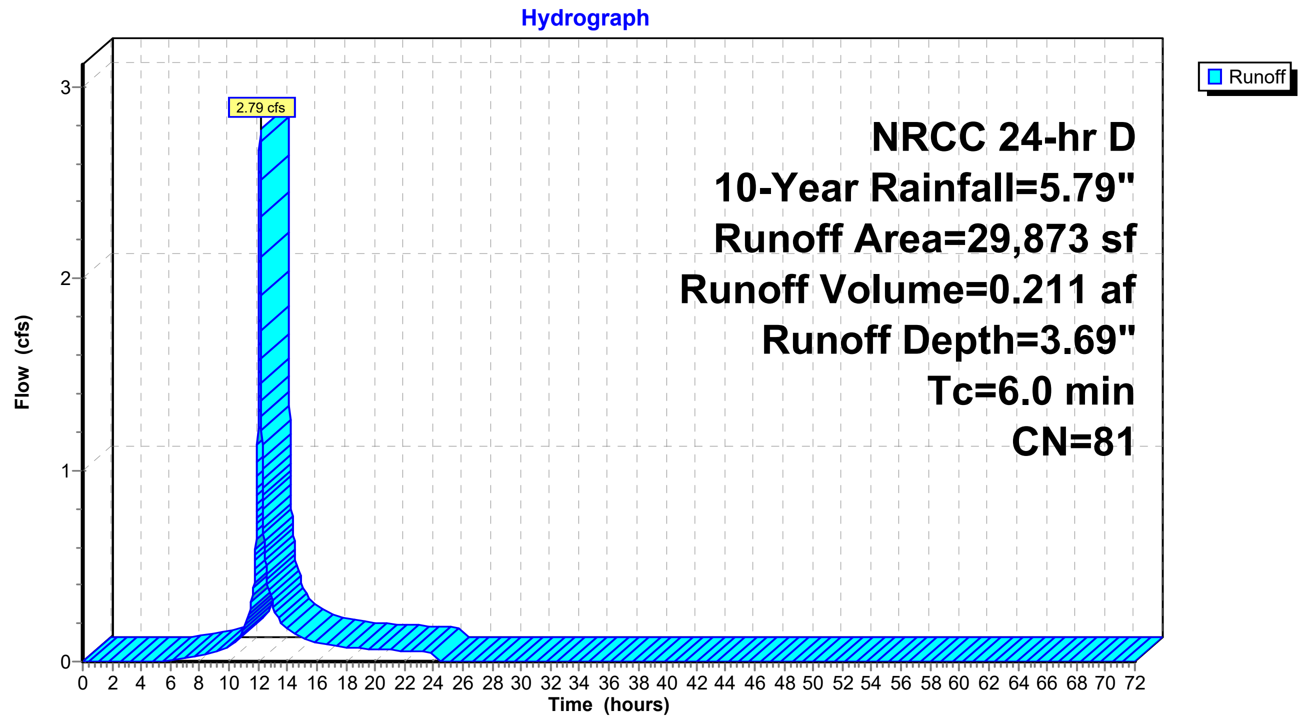
Runoff = 2.79 cfs @ 12.13 hrs, Volume= 0.211 af, Depth= 3.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-Year Rainfall=5.79"

	Area (sf)	CN	Description
	8,411	39	>75% Grass cover, Good, HSG A
	574	98	Impervious Surface, HSG A
*	20,888	98	Porous Pavement, HSG A
	29,873	81	Weighted Average
	8,411		28.16% Pervious Area
	21,462		71.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1B: Area Draining to Parking Lot



Summary for Subcatchment 2: Subcatchment 2

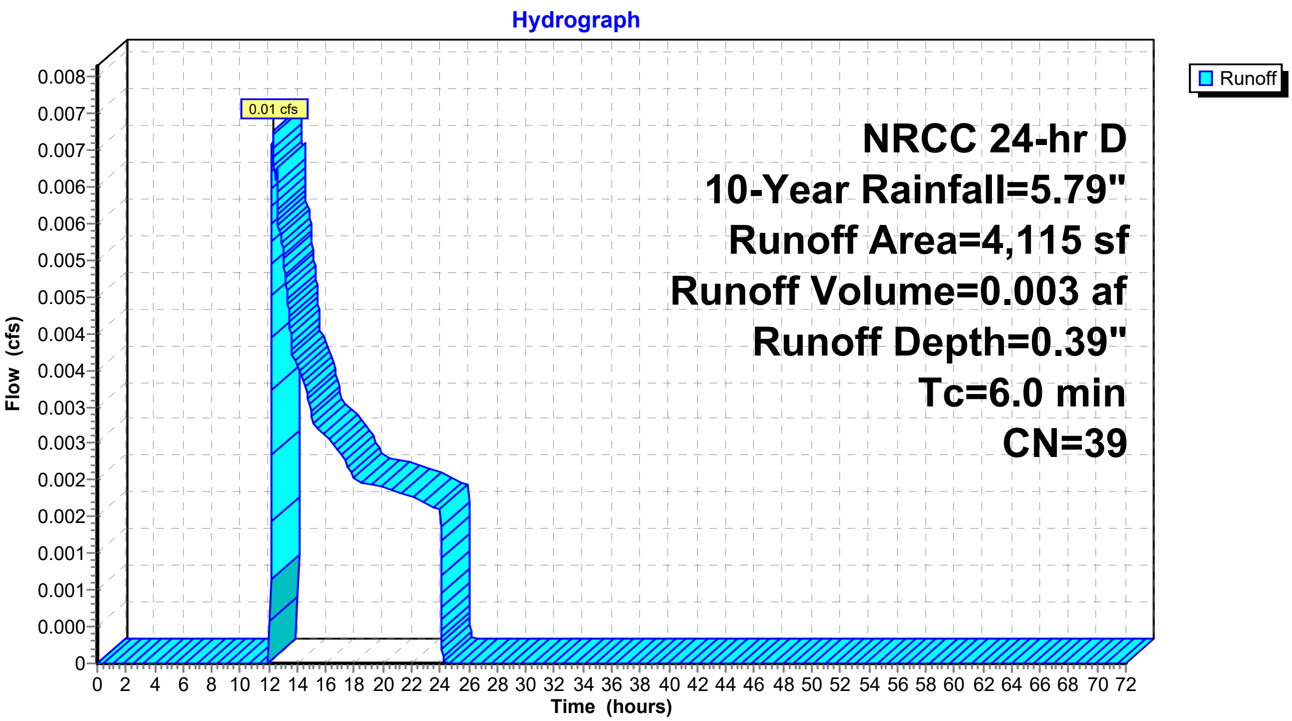
Runoff = 0.01 cfs @ 12.34 hrs, Volume= 0.003 af, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-Year Rainfall=5.79"

Area (sf)	CN	Description
4,115	39	>75% Grass cover, Good, HSG A
4,115		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2



Summary for Pond P1: Porous Pavement

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=575)

Inflow Area = 0.686 ac, 71.84% Impervious, Inflow Depth = 3.69" for 10-Year event
Inflow = 2.79 cfs @ 12.13 hrs, Volume= 0.211 af
Outflow = 1.19 cfs @ 12.10 hrs, Volume= 0.211 af, Atten= 57%, Lag= 0.0 min
Discarded = 1.19 cfs @ 12.10 hrs, Volume= 0.211 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 161.49' @ 12.25 hrs Surf.Area= 21,411 sf Storage= 748 cf
Flood Elev= 164.00' Surf.Area= 42,822 sf Storage= 11,383 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.8 min (833.9 - 832.2)

Volume	Invert	Avail.Storage	Storage Description
#1	161.40'	7,099 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 17,771 cf Overall - 23 cf Embedded = 17,749 cf x 40.0% Voids
#2	162.23'	4,261 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#3	161.73'	23 cf	**4.0" Round Pipe Storage** Inside #1 L= 258.0'
		11,383 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
161.40	21,411	0	0
162.23	21,411	17,771	17,771

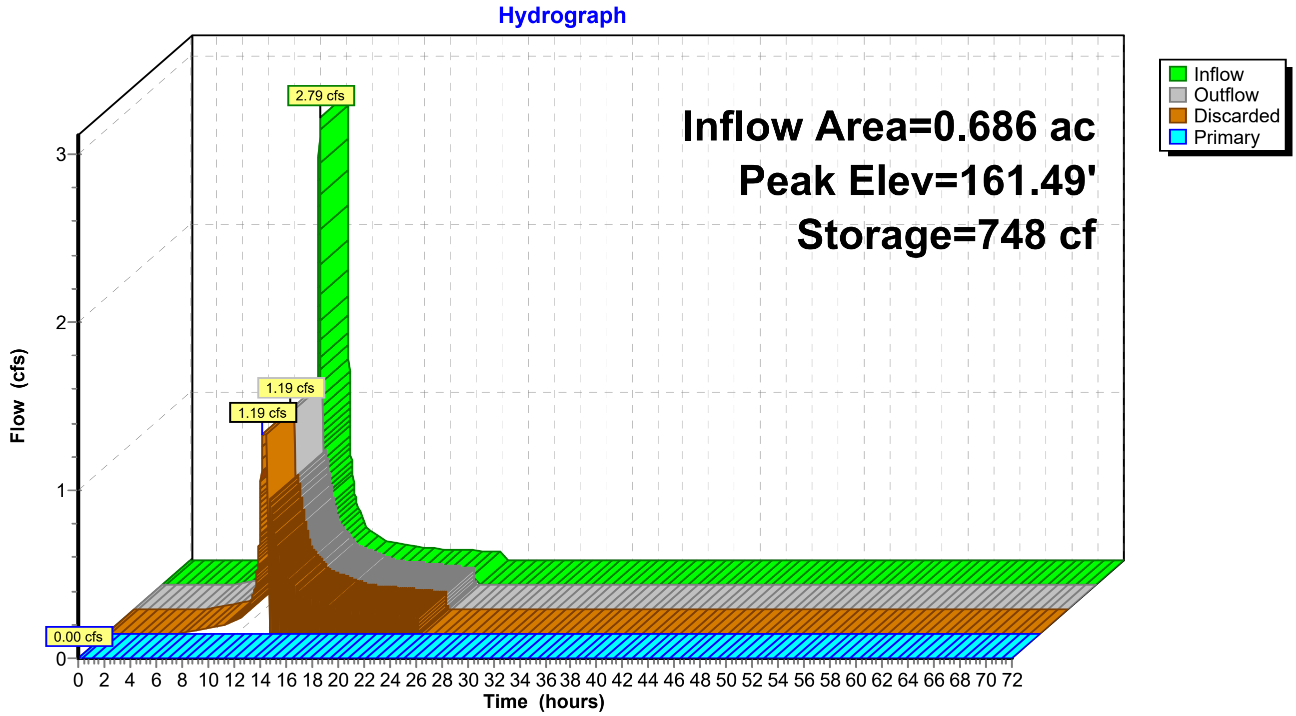
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
162.23	21,411	0.0	0	0
162.48	21,411	40.0	2,141	2,141
162.81	21,411	30.0	2,120	4,261

Device	Routing	Invert	Outlet Devices
#1	Primary	162.15'	**12.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 162.15' / 162.05' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	161.73'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	161.40'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.19 cfs @ 12.10 hrs HW=161.43' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.40' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond P1: Porous Pavement

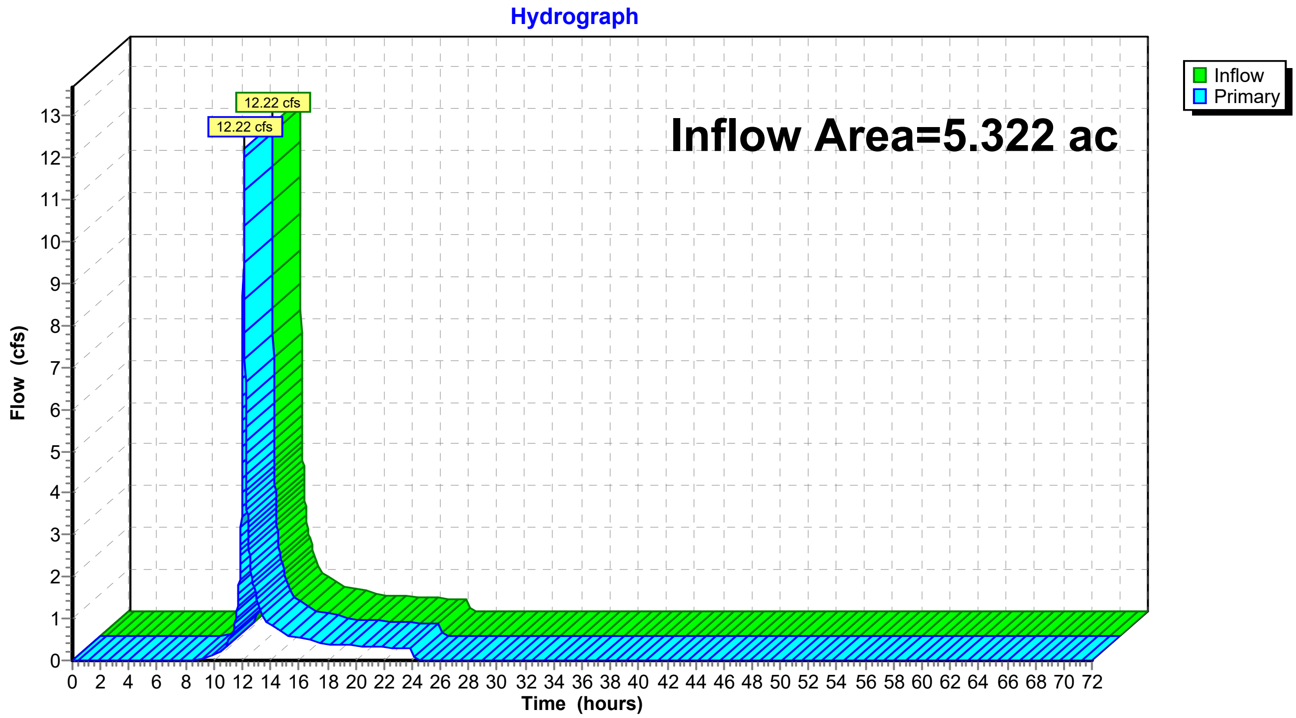


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.322 ac, 41.12% Impervious, Inflow Depth = 2.07"	for 10-Year event	
Inflow =	12.22 cfs @ 12.13 hrs, Volume=	0.917 af	
Primary =	12.22 cfs @ 12.13 hrs, Volume=	0.917 af, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

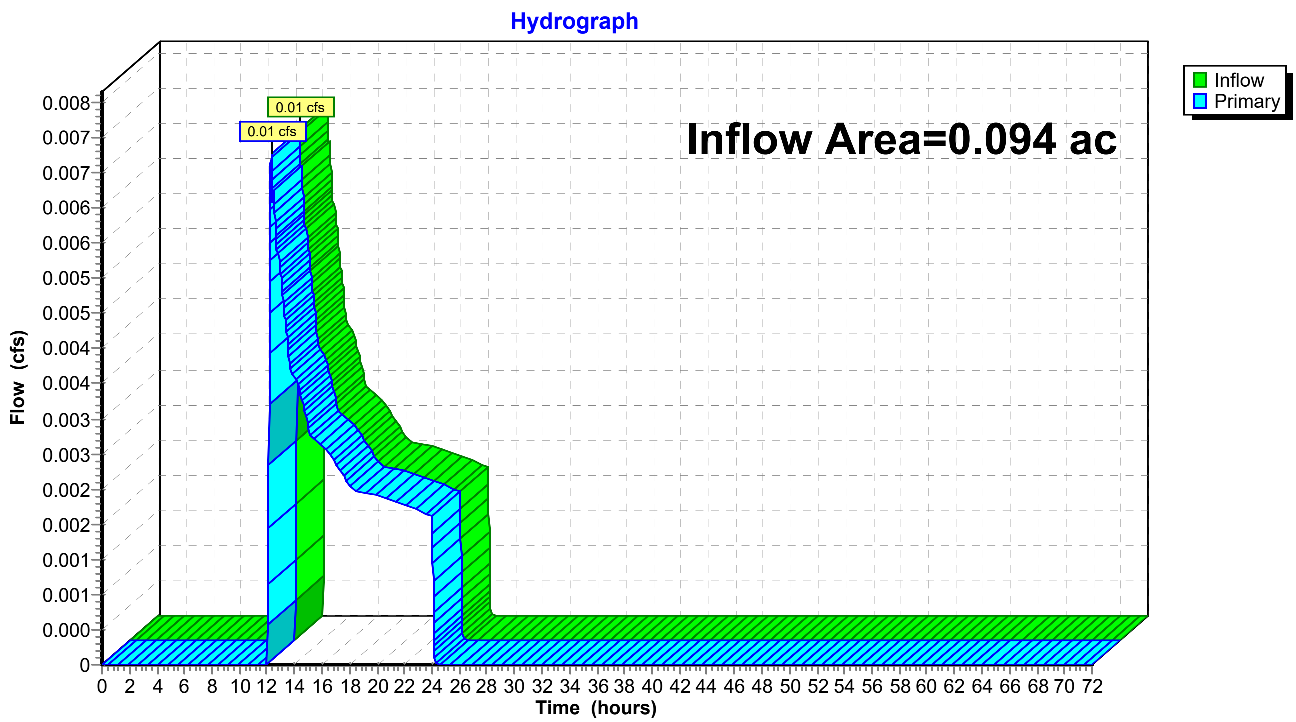


Summary for Link DP-2: Ditch

Inflow Area =	0.094 ac,	0.00% Impervious, Inflow Depth = 0.39"	for 10-Year event	
Inflow =	0.01 cfs @	12.34 hrs, Volume=	0.003 af	
Primary =	0.01 cfs @	12.34 hrs, Volume=	0.003 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Total Subcatchment1 Runoff Area=231,818 sf 41.12% Impervious Runoff Depth=3.91"
Tc=6.0 min CN=69 Runoff=23.23 cfs 1.735 af

Subcatchment1A: Subcatchment1 Runoff Area=201,945 sf 36.57% Impervious Runoff Depth=3.69"
Tc=6.0 min CN=67 Runoff=19.13 cfs 1.427 af

Subcatchment1B: Area Draining to Runoff Area=29,873 sf 71.84% Impervious Runoff Depth=5.25"
Tc=6.0 min CN=81 Runoff=3.90 cfs 0.300 af

Subcatchment2: Subcatchment2 Runoff Area=4,115 sf 0.00% Impervious Runoff Depth=0.95"
Tc=6.0 min CN=39 Runoff=0.06 cfs 0.007 af

Pond P1: Porous Pavement Peak Elev=161.59' Storage=1,616 cf Inflow=3.90 cfs 0.300 af
Discarded=1.19 cfs 0.300 af Primary=0.00 cfs 0.000 af Outflow=1.19 cfs 0.300 af

Link DP-1: Reservoir and Swimming Area Inflow=19.13 cfs 1.427 af
Primary=19.13 cfs 1.427 af

Link DP-2: Ditch Inflow=0.06 cfs 0.007 af
Primary=0.06 cfs 0.007 af

Total Runoff Area = 10.738 ac Runoff Volume = 3.469 af Average Runoff Depth = 3.88"
59.24% Pervious = 6.362 ac 40.76% Impervious = 4.376 ac

Summary for Subcatchment 1: Total Subcatchment 1 Area

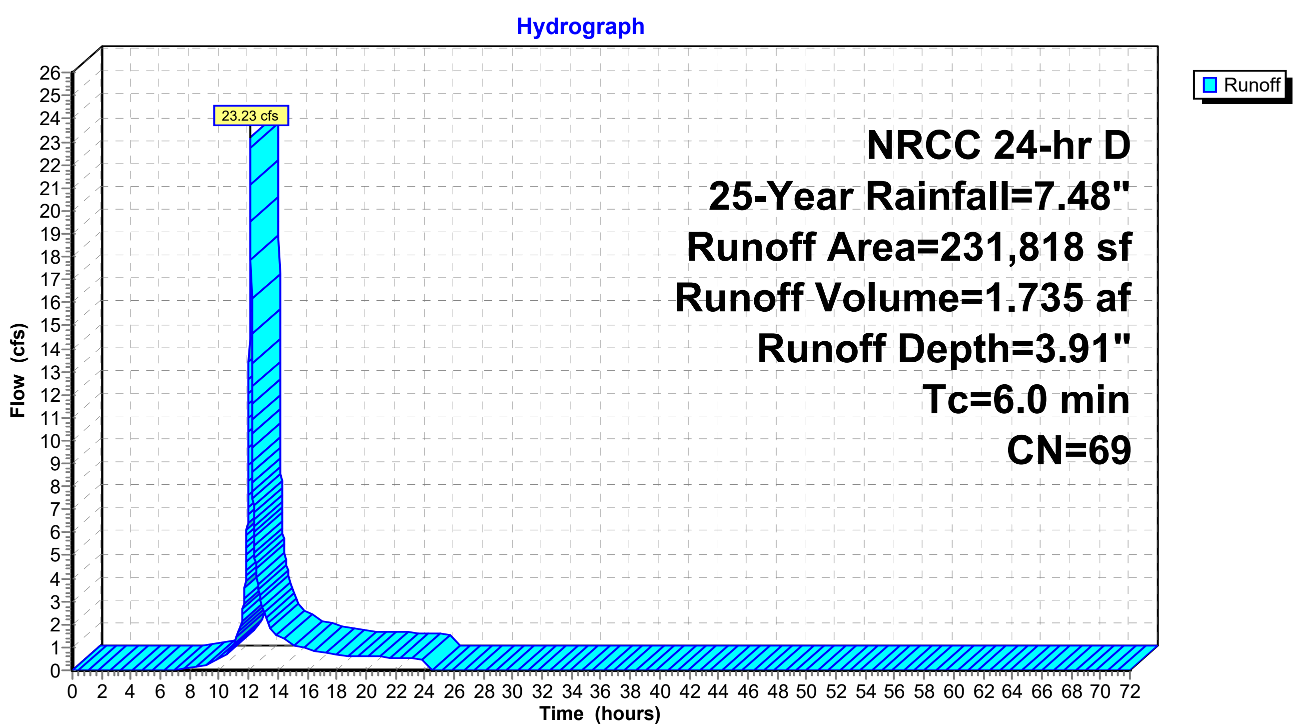
Runoff = 23.23 cfs @ 12.13 hrs, Volume= 1.735 af, Depth= 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-Year Rainfall=7.48"

	Area (sf)	CN	Description
	13,237	30	Brush, Good, HSG A
*	44,830	63	Beach Sand, HSG A
	64,412	39	>75% Grass cover, Good, HSG A
	20,338	98	Impervious Surface, HSG A
*	22,688	98	Porous Pavement, HSG A
	52,292	98	Water Surface, HSG A
*	6,010	96	Stone Dust, HSG A
*	8,011	39	Permeable Playground Surfaces, Good, HSG A
	231,818	69	Weighted Average
	136,500		58.88% Pervious Area
	95,318		41.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1: Total Subcatchment 1 Area



Summary for Subcatchment 1A: Subcatchment 1 Minus Parking Lot

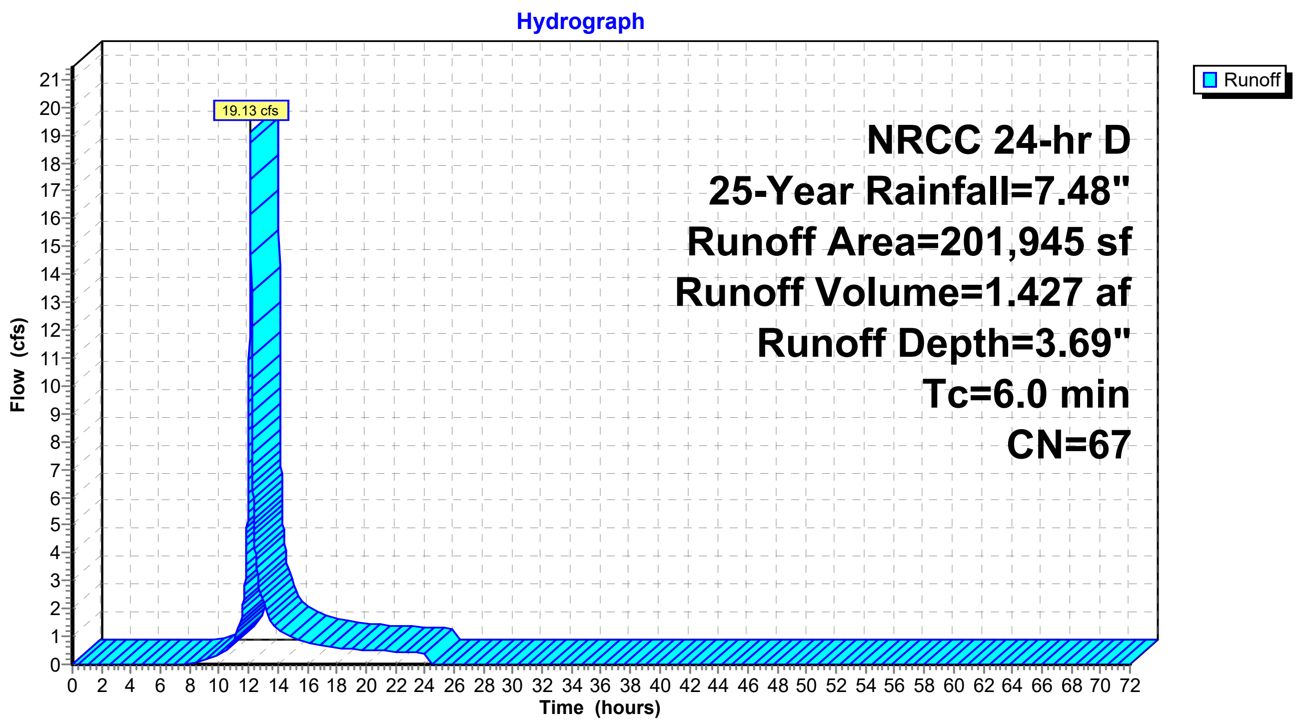
Runoff = 19.13 cfs @ 12.13 hrs, Volume= 1.427 af, Depth= 3.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-Year Rainfall=7.48"

	Area (sf)	CN	Description
	13,237	30	Brush, Good, HSG A
*	44,830	63	Beach Sand, HSG A
	56,001	39	>75% Grass cover, Good, HSG A
	19,764	98	Impervious Surface, HSG A
*	1,800	98	Porous Pavement, HSG A
	52,292	98	Water Surface, HSG A
*	6,010	96	Stone Dust, HSG A
*	8,011	39	Permeable Playground Surface, Good, HSG A
	201,945	67	Weighted Average
	128,089		63.43% Pervious Area
	73,856		36.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1A: Subcatchment 1 Minus Parking Lot



Summary for Subcatchment 1B: Area Draining to Parking Lot

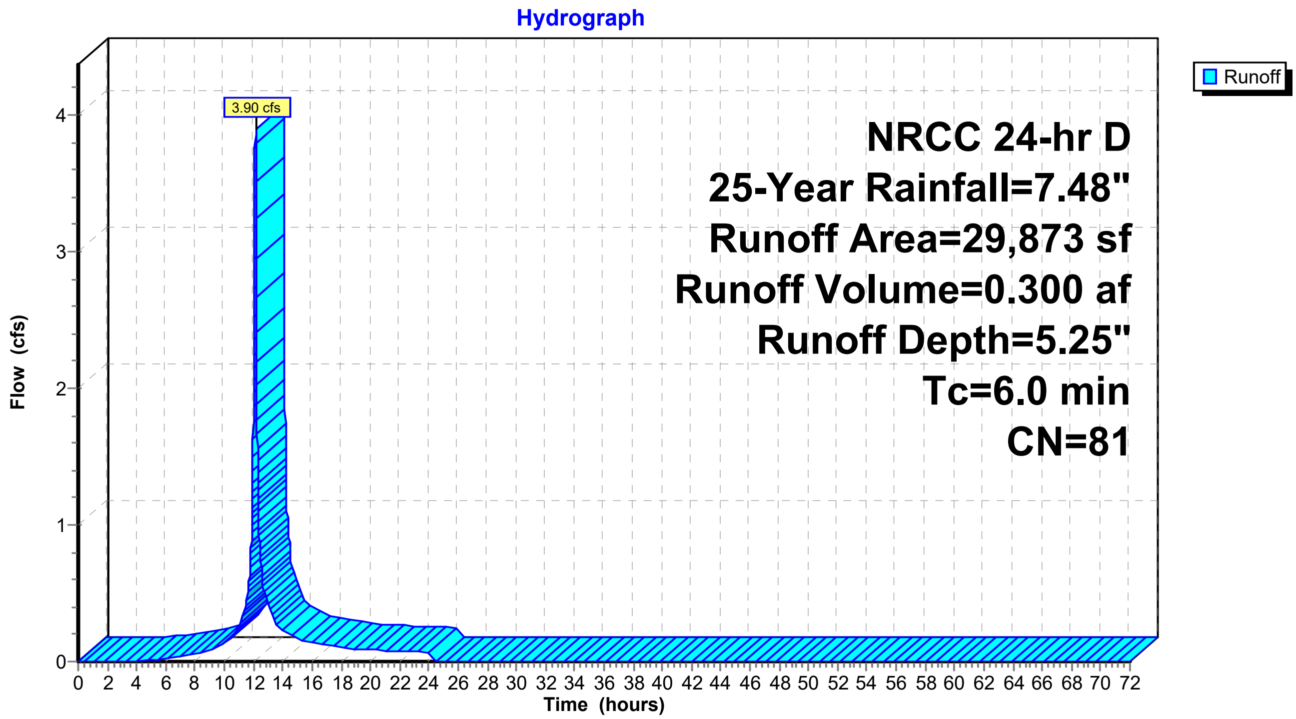
Runoff = 3.90 cfs @ 12.13 hrs, Volume= 0.300 af, Depth= 5.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-Year Rainfall=7.48"

	Area (sf)	CN	Description
	8,411	39	>75% Grass cover, Good, HSG A
	574	98	Impervious Surface, HSG A
*	20,888	98	Porous Pavement, HSG A
	29,873	81	Weighted Average
	8,411		28.16% Pervious Area
	21,462		71.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1B: Area Draining to Parking Lot



Summary for Subcatchment 2: Subcatchment 2

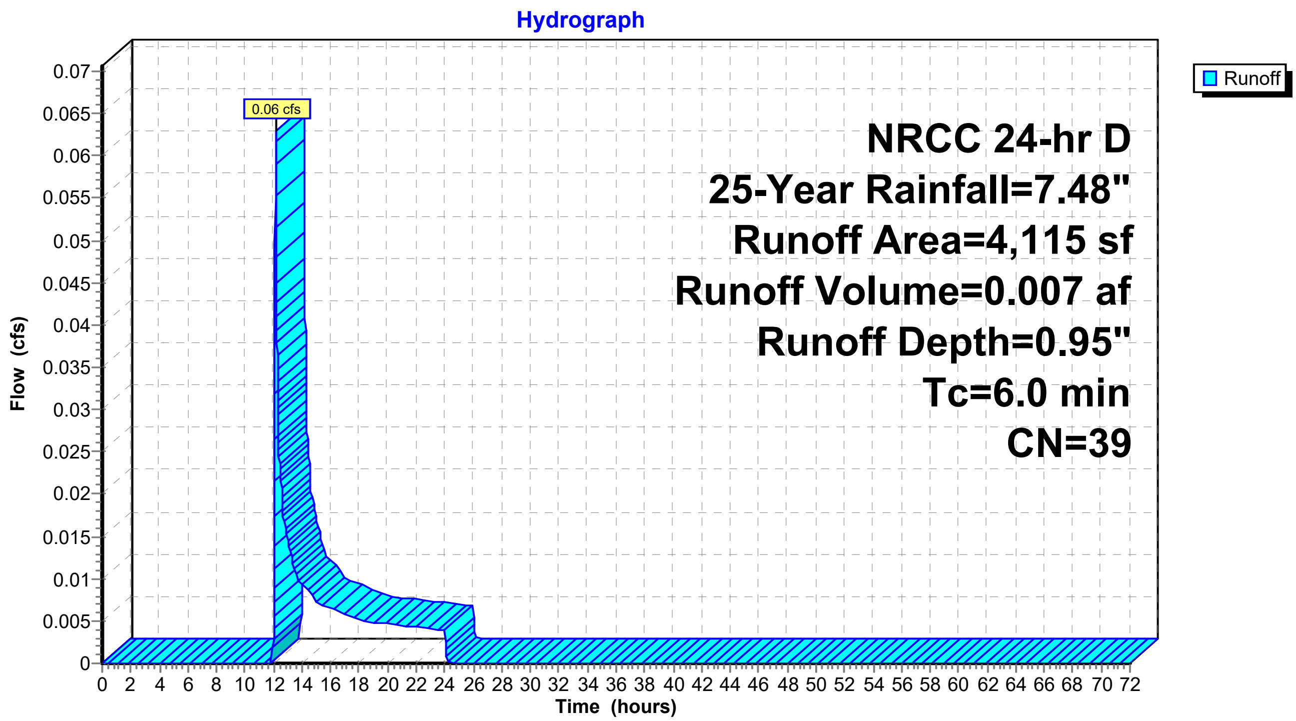
Runoff = 0.06 cfs @ 12.15 hrs, Volume= 0.007 af, Depth= 0.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 25-Year Rainfall=7.48"

Area (sf)	CN	Description
4,115	39	>75% Grass cover, Good, HSG A
4,115		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2



Summary for Pond P1: Porous Pavement

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=554)

Inflow Area = 0.686 ac, 71.84% Impervious, Inflow Depth = 5.25" for 25-Year event
Inflow = 3.90 cfs @ 12.13 hrs, Volume= 0.300 af
Outflow = 1.19 cfs @ 12.04 hrs, Volume= 0.300 af, Atten= 69%, Lag= 0.0 min
Discarded = 1.19 cfs @ 12.04 hrs, Volume= 0.300 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 161.59' @ 12.31 hrs Surf.Area= 21,411 sf Storage= 1,616 cf
Flood Elev= 164.00' Surf.Area= 42,822 sf Storage= 11,383 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 4.8 min (824.0 - 819.2)

Volume	Invert	Avail.Storage	Storage Description
#1	161.40'	7,099 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 17,771 cf Overall - 23 cf Embedded = 17,749 cf x 40.0% Voids
#2	162.23'	4,261 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#3	161.73'	23 cf	**4.0" Round Pipe Storage** Inside #1 L= 258.0'
		11,383 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
161.40	21,411	0	0
162.23	21,411	17,771	17,771

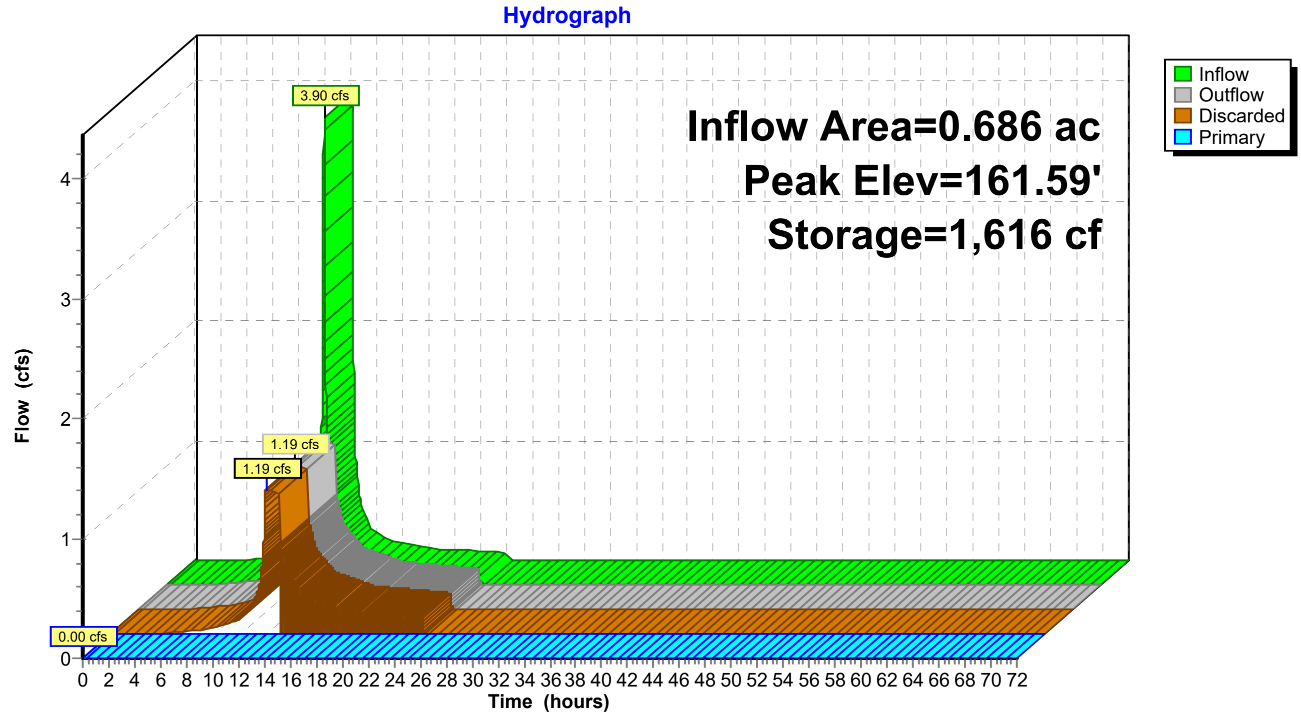
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
162.23	21,411	0.0	0	0
162.48	21,411	40.0	2,141	2,141
162.81	21,411	30.0	2,120	4,261

Device	Routing	Invert	Outlet Devices
#1	Primary	162.15'	**12.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 162.15' / 162.05' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	161.73'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	161.40'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.19 cfs @ 12.04 hrs HW=161.43' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.40' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond P1: Porous Pavement

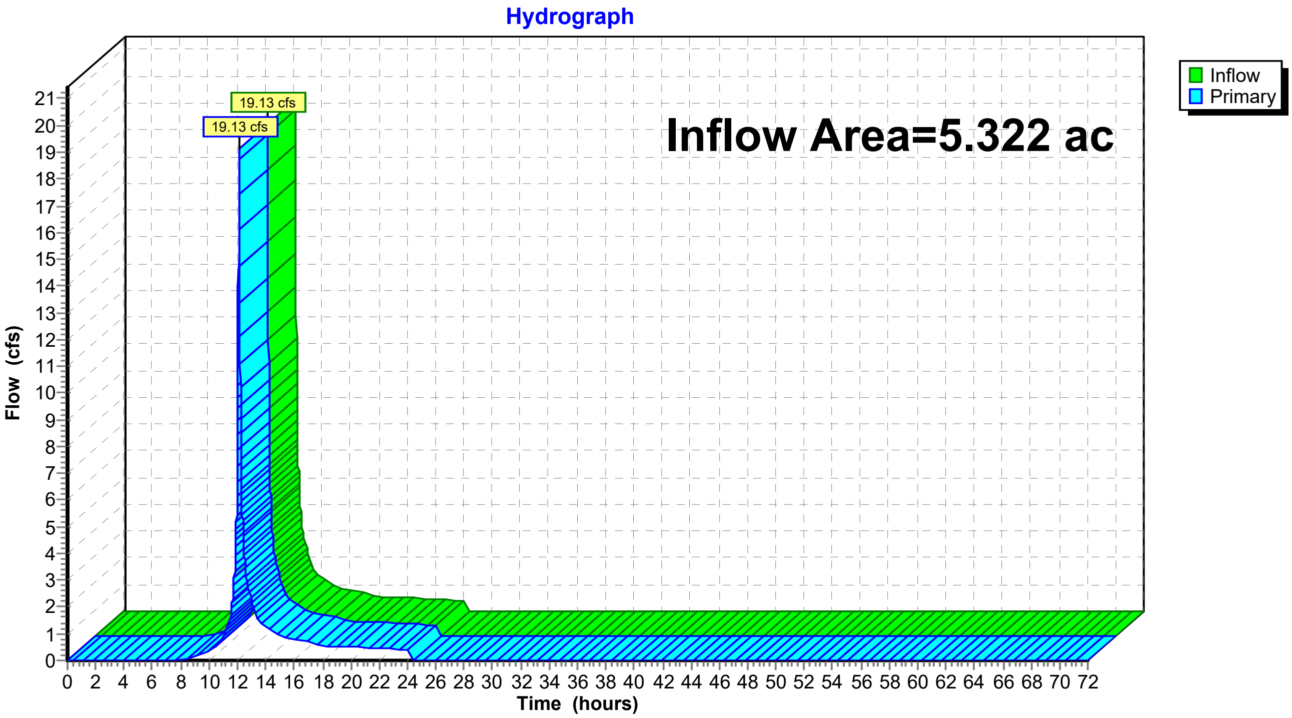


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.322 ac,	41.12% Impervious,	Inflow Depth = 3.22"	for 25-Year event	
Inflow =	19.13 cfs @	12.13 hrs,	Volume=	1.427 af	
Primary =	19.13 cfs @	12.13 hrs,	Volume=	1.427 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

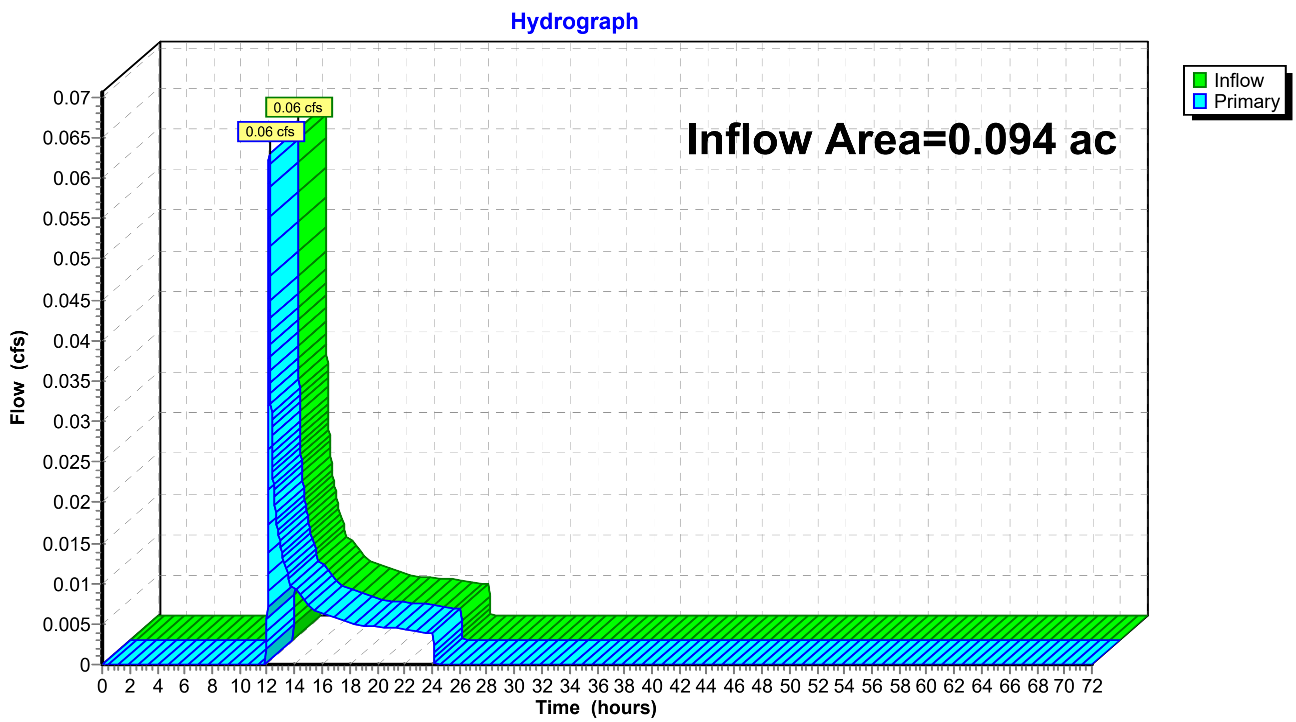


Summary for Link DP-2: Ditch

Inflow Area =	0.094 ac,	0.00% Impervious,	Inflow Depth = 0.95"	for 25-Year event	
Inflow =	0.06 cfs @	12.15 hrs,	Volume=	0.007 af	
Primary =	0.06 cfs @	12.15 hrs,	Volume=	0.007 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1: Total Subcatchment1 Runoff Area=231,818 sf 41.12% Impervious Runoff Depth=6.41"
Tc=6.0 min CN=69 Runoff=37.63 cfs 2.841 af

Subcatchment1A: Subcatchment1 Runoff Area=201,945 sf 36.57% Impervious Runoff Depth=6.14"
Tc=6.0 min CN=67 Runoff=31.54 cfs 2.371 af

Subcatchment1B: Area Draining to Runoff Area=29,873 sf 71.84% Impervious Runoff Depth=7.99"
Tc=6.0 min CN=81 Runoff=5.79 cfs 0.456 af

Subcatchment2: Subcatchment2 Runoff Area=4,115 sf 0.00% Impervious Runoff Depth=2.28"
Tc=6.0 min CN=39 Runoff=0.21 cfs 0.018 af

Pond P1: Porous Pavement Peak Elev=161.80' Storage=3,457 cf Inflow=5.79 cfs 0.456 af
Discarded=1.19 cfs 0.456 af Primary=0.00 cfs 0.000 af Outflow=1.19 cfs 0.456 af

Link DP-1: Reservoir and Swimming Area Inflow=31.54 cfs 2.371 af
Primary=31.54 cfs 2.371 af

Link DP-2: Ditch Inflow=0.21 cfs 0.018 af
Primary=0.21 cfs 0.018 af

Total Runoff Area = 10.738 ac Runoff Volume = 5.686 af Average Runoff Depth = 6.35"
59.24% Pervious = 6.362 ac 40.76% Impervious = 4.376 ac

Summary for Subcatchment 1: Total Subcatchment 1 Area

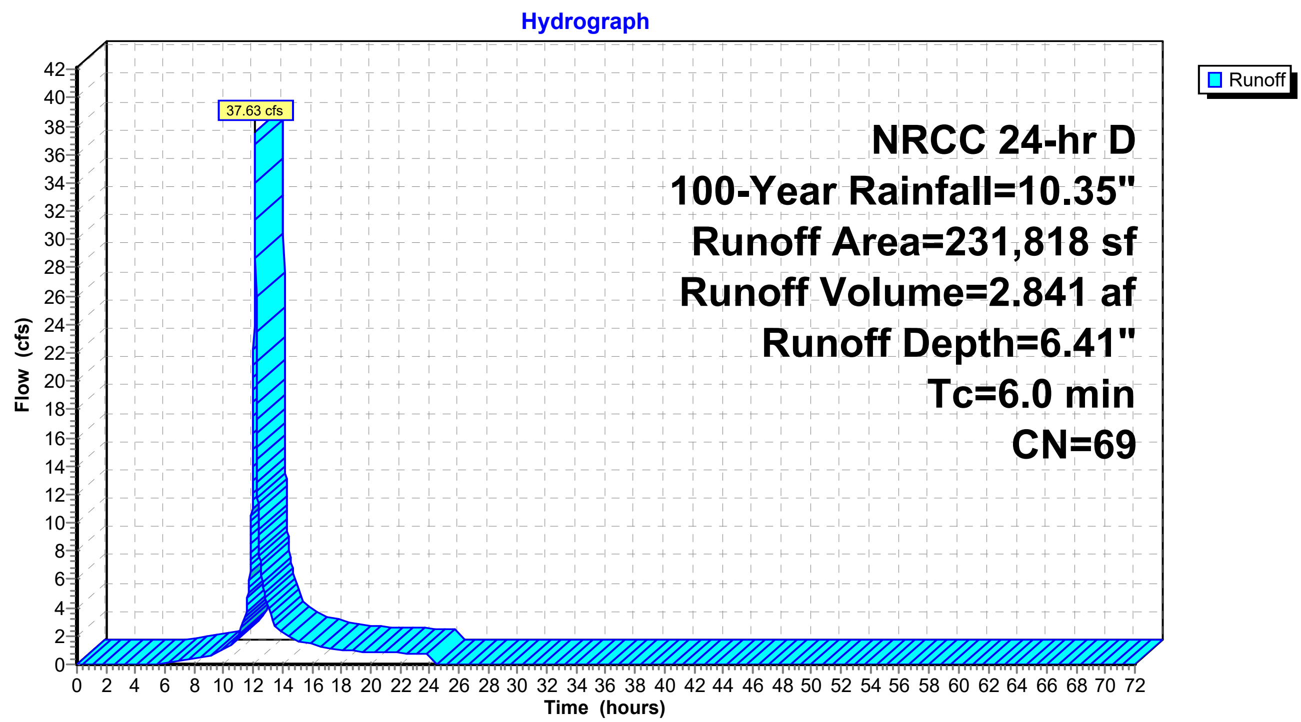
Runoff = 37.63 cfs @ 12.13 hrs, Volume= 2.841 af, Depth= 6.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-Year Rainfall=10.35"

	Area (sf)	CN	Description
	13,237	30	Brush, Good, HSG A
*	44,830	63	Beach Sand, HSG A
	64,412	39	>75% Grass cover, Good, HSG A
	20,338	98	Impervious Surface, HSG A
*	22,688	98	Porous Pavement, HSG A
	52,292	98	Water Surface, HSG A
*	6,010	96	Stone Dust, HSG A
*	8,011	39	Permeable Playground Surfaces, Good, HSG A
	231,818	69	Weighted Average
	136,500		58.88% Pervious Area
	95,318		41.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1: Total Subcatchment 1 Area



Summary for Subcatchment 1A: Subcatchment 1 Minus Parking Lot

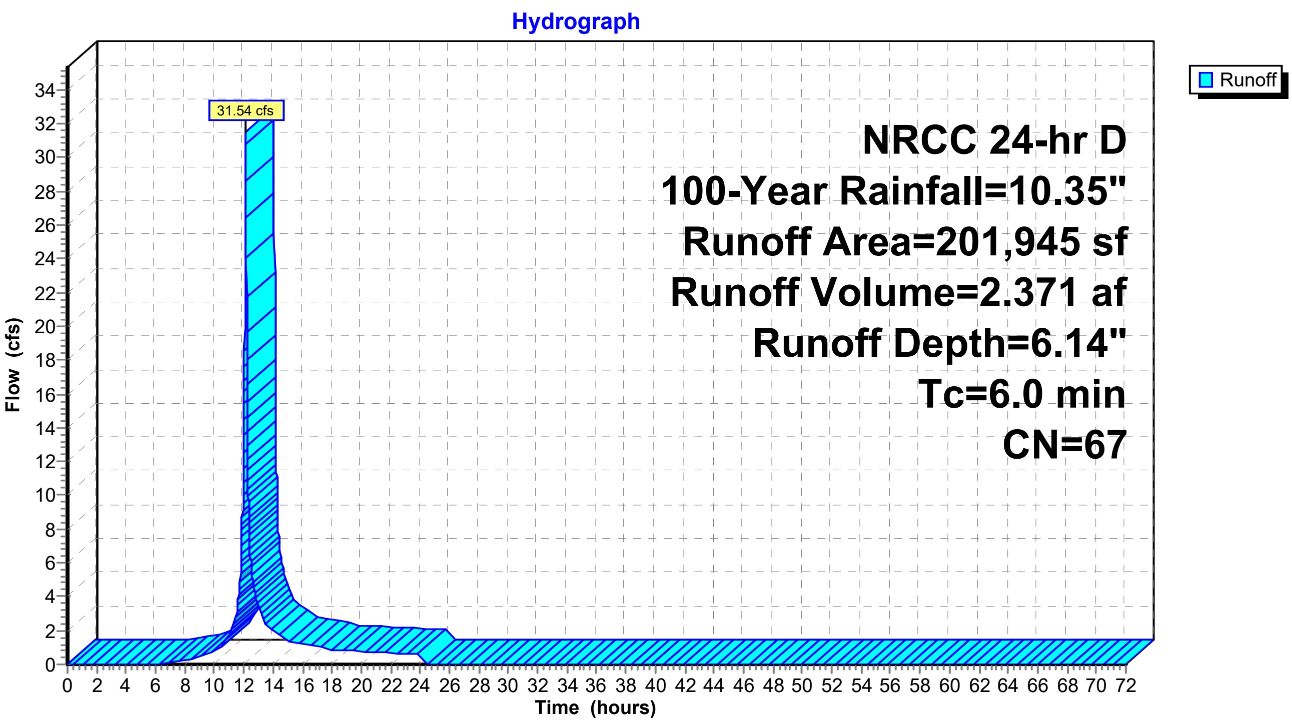
Runoff = 31.54 cfs @ 12.13 hrs, Volume= 2.371 af, Depth= 6.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-Year Rainfall=10.35"

	Area (sf)	CN	Description
	13,237	30	Brush, Good, HSG A
*	44,830	63	Beach Sand, HSG A
	56,001	39	>75% Grass cover, Good, HSG A
	19,764	98	Impervious Surface, HSG A
*	1,800	98	Porous Pavement, HSG A
	52,292	98	Water Surface, HSG A
*	6,010	96	Stone Dust, HSG A
*	8,011	39	Permeable Playground Surface, Good, HSG A
	201,945	67	Weighted Average
	128,089		63.43% Pervious Area
	73,856		36.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1A: Subcatchment 1 Minus Parking Lot



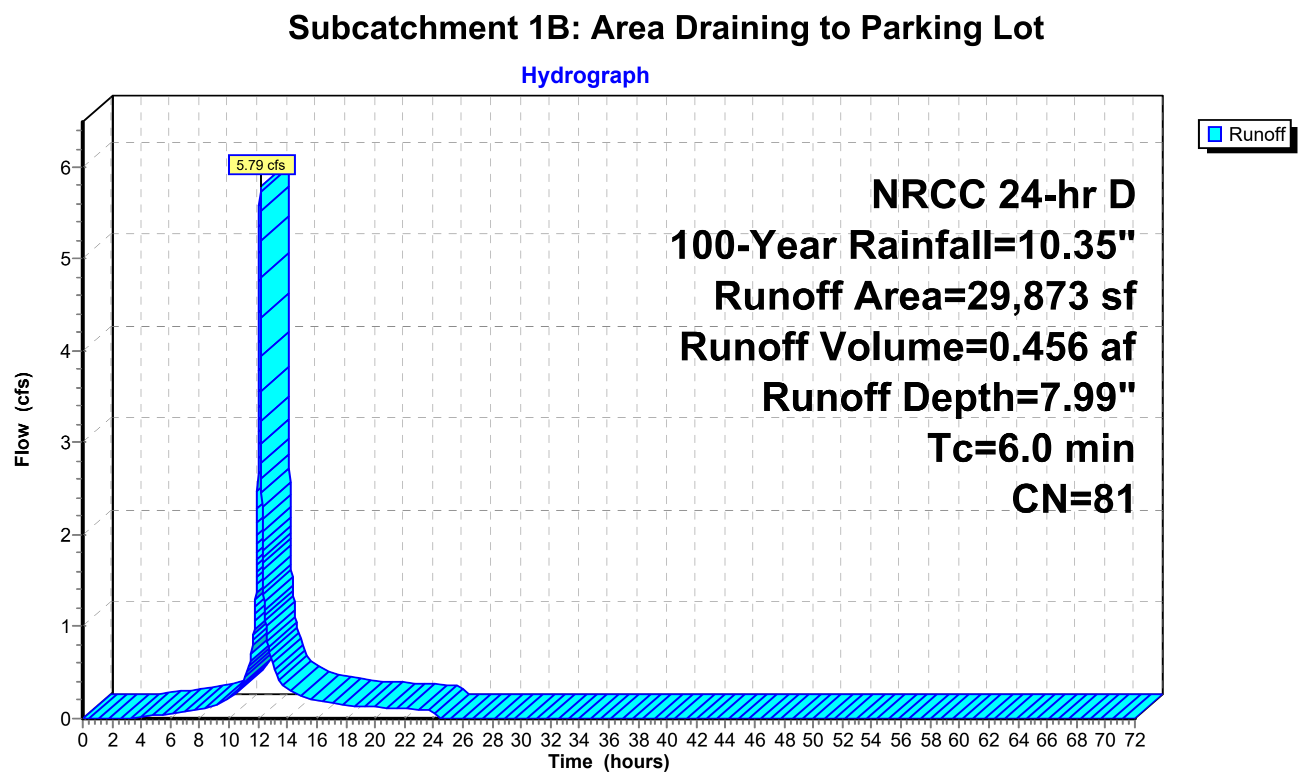
Summary for Subcatchment 1B: Area Draining to Parking Lot

Runoff = 5.79 cfs @ 12.13 hrs, Volume= 0.456 af, Depth= 7.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-Year Rainfall=10.35"

	Area (sf)	CN	Description
	8,411	39	>75% Grass cover, Good, HSG A
	574	98	Impervious Surface, HSG A
*	20,888	98	Porous Pavement, HSG A
	29,873	81	Weighted Average
	8,411		28.16% Pervious Area
	21,462		71.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**



Summary for Subcatchment 2: Subcatchment 2

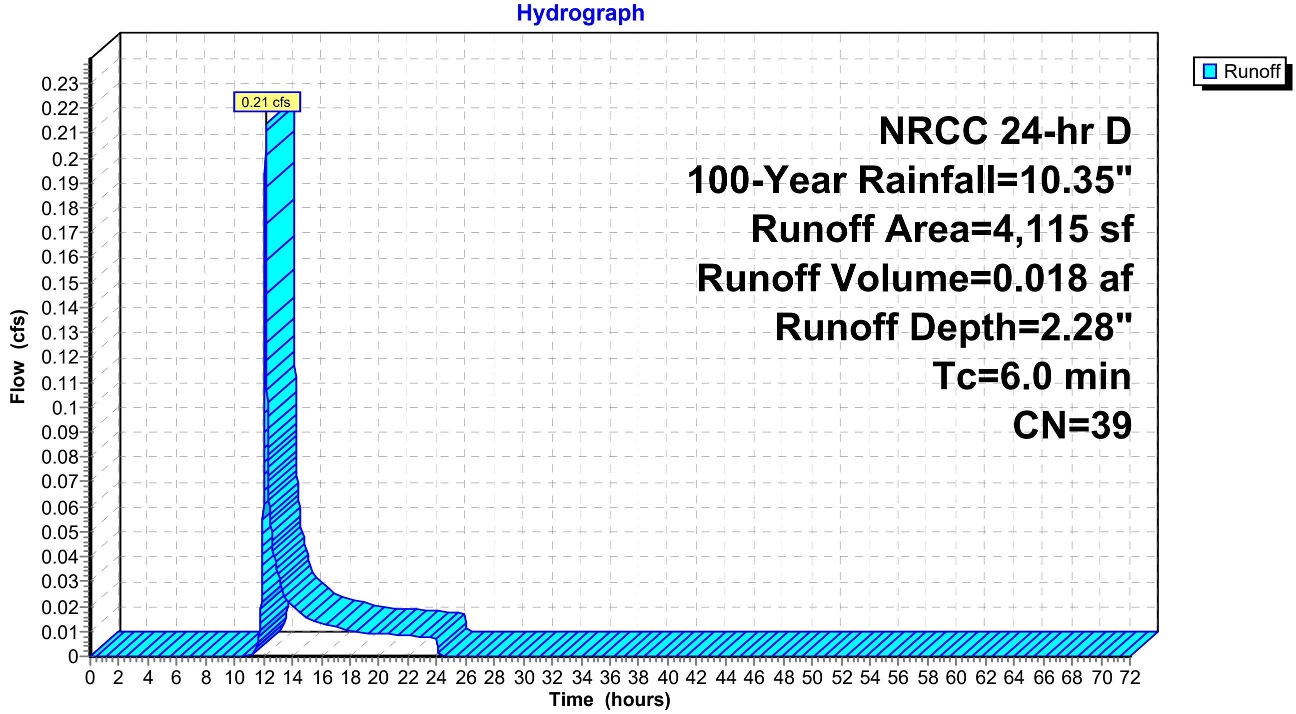
Runoff = 0.21 cfs @ 12.14 hrs, Volume= 0.018 af, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-Year Rainfall=10.35"

Area (sf)	CN	Description
4,115	39	>75% Grass cover, Good, HSG A
4,115		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2: Subcatchment 2



Summary for Pond P1: Porous Pavement

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=510)

Inflow Area = 0.686 ac, 71.84% Impervious, Inflow Depth = 7.99" for 100-Year event
Inflow = 5.79 cfs @ 12.13 hrs, Volume= 0.456 af
Outflow = 1.19 cfs @ 11.96 hrs, Volume= 0.456 af, Atten= 79%, Lag= 0.0 min
Discarded = 1.19 cfs @ 11.96 hrs, Volume= 0.456 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
Peak Elev= 161.80' @ 12.41 hrs Surf.Area= 21,411 sf Storage= 3,457 cf
Flood Elev= 164.00' Surf.Area= 42,822 sf Storage= 11,383 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 12.9 min (817.1 - 804.2)

Volume	Invert	Avail.Storage	Storage Description
#1	161.40'	7,099 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 17,771 cf Overall - 23 cf Embedded = 17,749 cf x 40.0% Voids
#2	162.23'	4,261 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#3	161.73'	23 cf	**4.0" Round Pipe Storage** Inside #1 L= 258.0'
		11,383 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
161.40	21,411	0	0
162.23	21,411	17,771	17,771

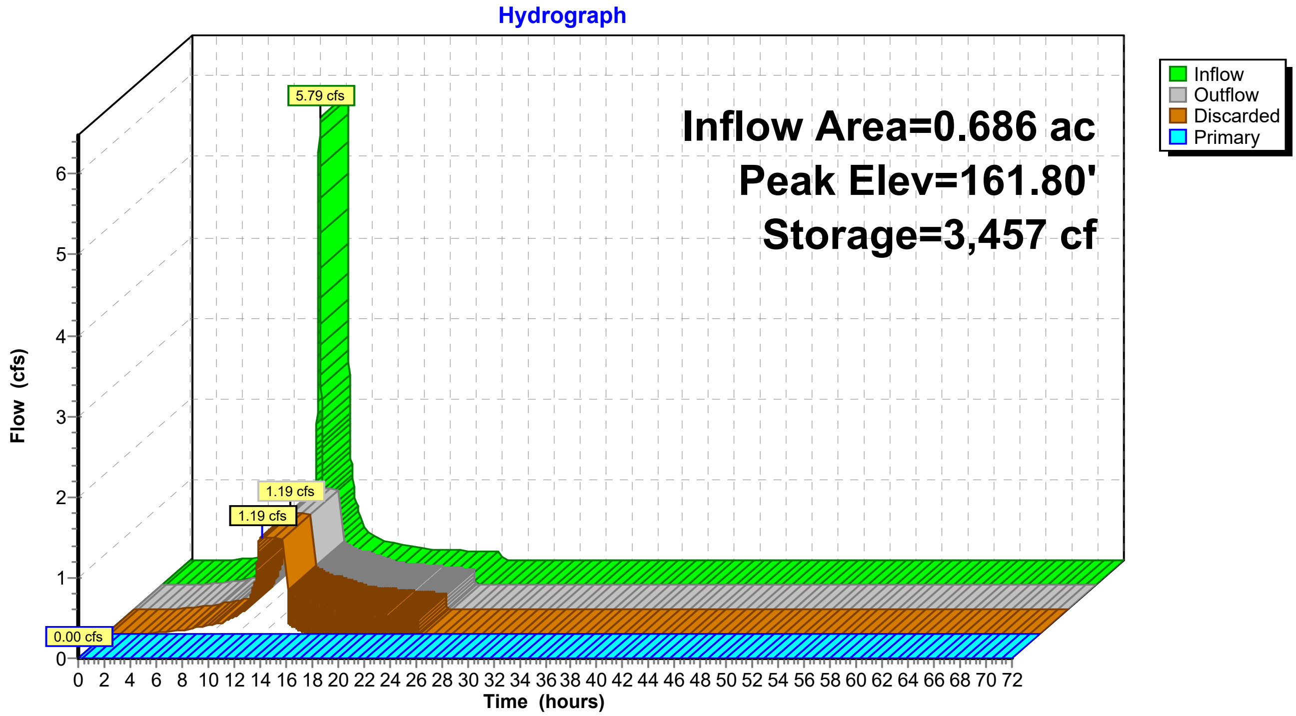
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
162.23	21,411	0.0	0	0
162.48	21,411	40.0	2,141	2,141
162.81	21,411	30.0	2,120	4,261

Device	Routing	Invert	Outlet Devices
#1	Primary	162.15'	**12.0" Round Culvert** L= 20.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 162.15' / 162.05' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	161.73'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	161.40'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.19 cfs @ 11.96 hrs HW=161.43' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 1.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=161.40' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)
  └─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond P1: Porous Pavement

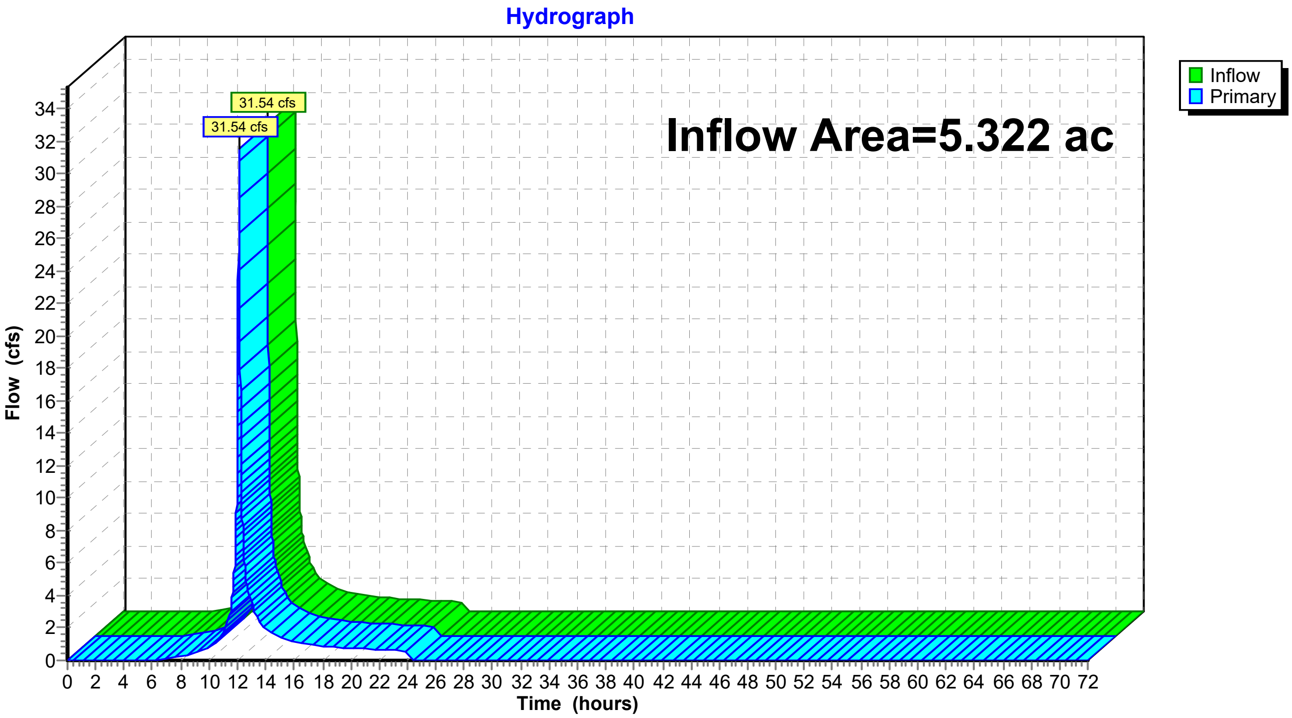


Summary for Link DP-1: Reservoir and Swimming Area

Inflow Area =	5.322 ac, 41.12% Impervious,	Inflow Depth = 5.35"	for 100-Year event	
Inflow =	31.54 cfs @	12.13 hrs, Volume=	2.371 af	
Primary =	31.54 cfs @	12.13 hrs, Volume=	2.371 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-1: Reservoir and Swimming Area

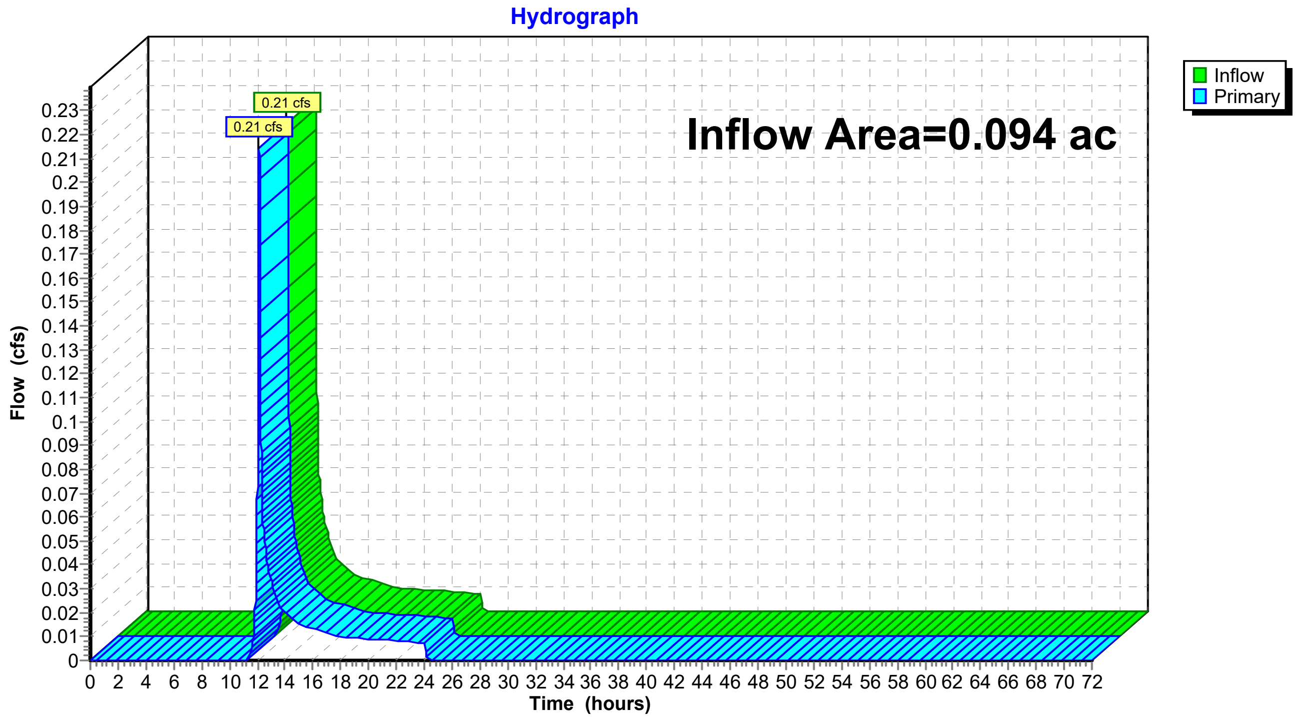


Summary for Link DP-2: Ditch

Inflow Area =	0.094 ac,	0.00% Impervious, Inflow Depth = 2.28"	for 100-Year event	
Inflow =	0.21 cfs @	12.14 hrs, Volume=	0.018 af	
Primary =	0.21 cfs @	12.14 hrs, Volume=	0.018 af,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link DP-2: Ditch



APPENDIX E: OPERATIONS & MAINTENANCE PLAN

STORMWATER MANAGEMENT SYSTEM
OPERATION & MAINTENANCE PLAN

This Stormwater Management System Operations & Maintenance Plan (the Plan) outlines measures that are essential for maintaining an effective stormwater management system at the Arlington Reservoir, located at 210 Lowell Street in Arlington, Massachusetts (the Site). Periodic and scheduled inspections and maintenance measures are recommended to prevent deficiencies and for proper performance of the stormwater management system. Failure to implement these measures can reduce the hydraulic capacity and the pollutant removal efficiency of stormwater measures resulting in a poor quality of stormwater runoff discharging from the Site.

RESPONSIBLE PARTY & ESTIMATED ANNUAL BUDGET

The party responsible for implementing this Plan and identifying the source of necessary funds is as follows:

Town of Arlington, Massachusetts – Department of Public Works
51 Grove Street
Arlington, MA 02476
Telephone: (781) 316-3301

GOOD HOUSEKEEPING

The Site will be maintained as clean and orderly. Routine inspections of the Site for debris and sediment accumulations shall be performed. Debris and sediment shall be disposed of in accordance with local and State requirements.

INSPECTIONS & MAINTENANCE MEASURES

Stormwater management is provided by porous pavement sections, as illustrated on the Site Plans. Routine inspections and maintenance of the stormwater management system shall be performed in accordance with this Operation & Maintenance Plan. These measures are recommended to prevent deficiencies within the system that may result in poor quality of stormwater runoff.

A sample Inspection Form is attached and is recommended for use during inspections of the stormwater management system. The form includes a table that outlines specific inspection and maintenance measures, in addition to the following information that can be recorded by the inspector during the inspection. Completed Inspections Forms shall be kept at the Site to enable both Department of Public Works staff members and regulatory agencies to ensure that operation of the system is in compliance with this Operation & Maintenance Plan.

SOLID WASTE CONTAINMENT

Trash and recycling receptacles will be provided throughout the Site, as necessary. Receptacles should remain covered to prevent exposure with stormwater and to ensure waste will remain inside the receptacle. Waste collection must be performed regularly.

LANDSCAPE MANAGEMENT

Lawn and landscaped areas shall be inspected for patches of dead vegetation and erosion. If these conditions are observed, affected areas shall be stabilized and replanted with vegetation to prevent sediment from entering the stormwater management system.

The following measures shall be followed to minimize the potential for stormwater runoff pollution due to overwatering, dead vegetation and erosion, direct disposal of lawn clippings, and over-application of materials such as fertilizers and pesticides.

<u>Lawn Mowing</u>

The following mowing practices are recommended:

- Maintain sharp mower blades.

- Typically, avoid cutting grass shorter than 2 to 3 inches in height, to minimize weed growth. Grass can be cut lower in the spring and fall to stimulate root growth but should not be cut shorter than $1^1/_2$ inches.
- Do not dispose of grass clippings within the stormwater management system.
- Employ practices to minimize the potential for grass clippings to enter the stormwater management system.

Fertilizers & Pesticides

Use of pesticides and fertilizers should be minimized to the extent practicable. Application of these materials may degrade the quality of stormwater runoff and should therefore be applied cautiously. In addition, fertilizers and pesticides shall not be applied prior to rain events. These materials should be stored under cover to prevent their exposure to stormwater.

PERVIOUS AREA MANAGEMENT

Winter Operations

Remove accumulated snow after winter storm events to keep the site's parking lots open for operations and maintenance activities. Snow shall not be stored within pervious areas.

Plows with poly cutting blades are required for snow removal. With their use, no alterations to typical snow removal activities are required. Sand will prematurely clog the porous pavement system and should not be used for deicing. Magnesium Chloride is an alternative material that can be used for deicing, if necessary. Snow melts faster on porous pavement than traditional pavement, as melting water does not remain on the surface to insulate the remaining ice.

Pervious Pavement

The pervious pavement system shall be monitored for permeability and maintained with a regenerative air sweeper at least twice a year or more frequently, as needed. The frequency of cleanings will vary depending on Site conditions including frequency of traffic, local climate, and surrounding environment but should be performed once in the Spring and once in the Fall (after leaves have fallen but before the first snow fall) to assure the pavement's long function life.

Damage to the surface of the porous pavement can be repaired by using a concrete saw to remove the damaged area and installing new porous pavement in its place.

STORMWATER MANAGEMENT SYSTEM INSPECTION FORM

Town of Arlington, Massachusetts
Arlington Reservoir
210 Lowell Street
Arlington, MA 02474

Name of Inspector: ______________________________

Date/Time: ______________________________

Weather: ______________________________

Date of Last Inspection: ______________________________

Items Inspected (refer to Table 1 and provide additional sheets if necessary):

____

____

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Comments & Corrective Actions Taken (provide additional sheets if necessary):

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Table 1 – Operations & Maintenance Measures

Porous Pavement	
Objective: *Maintain the infiltration and storage capacity of the porous pavement section.*	
Frequency	***Measure***
Ongoing/As Needed	• Monitor the surface of the porous pavement to proper drainage is achieved during storm events.
Quarterly	• Remove sediment and organic debris on the porous pavement surface using a vacuum sweeper.
Bi-Annually (once in Spring and once in Fall)	• Inspect the surface of the porous pavement for deterioration or clogging. • Assess the infiltration capacity of the porous pavement sections.
Additional Comments	• Do not stockpile snow on porous pavement surface. This will require additional maintenance and vacuuming. • Do not sand over porous pavement surface.

APPENDIX F: STORMWATER POLLUTION PREVENTION PLAN

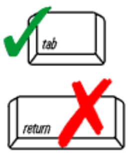
APPENDIX G: MASSDEP CHECKLIST FOR STORMWATER REPORT

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☐ New development

☒ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☐ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☒ Reduced Impervious Area (Redevelopment Only)
- ☒ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☒ Use of “country drainage” versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): ____________________

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☐ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☐ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☐ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☐ Static ☒ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☒ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☐ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

  ☐ is within the Zone II or Interim Wellhead Protection Area

  ☐ is near or to other critical areas

  ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)

  ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☐ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☐ The BMP is sized (and calculations provided) based on:

- ☐ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☒ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☒ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☒ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☒ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☒ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☒ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☒ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☐ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☐ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☒ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☐ An Illicit Discharge Compliance Statement is attached;

☒ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

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